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REMEDIAL DESIGN WORK PLAN FOR REMEDIAL ACTIONS AT OPERABLE UNIT 5 - JUNE 1996 - DRAFT FINAL

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REMEDIAL DESIGN WORK PLAN FOR REMEDIAL ACTIONS AT OPERABLE UNIT 5

FERNALD ENVIRONMENTAL MANAGEMENT PROJECT
FERNALD, OHIO

JUNE 1996

U.S. DEPARTMENT OF ENERGY
FERNALD AREA OFFICE

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DRAFT FINAL

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LIST OF ACRONYMS

ALARA	as low as reasonably achievable
ARAR	applicable or relevant and appropriate requirement
AWWT	advanced wastewater treatment [facility]
CAMU	corrective action management unit
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
COC	constituent of concern
D&D	decontamination & dismantlement
DOE	U.S. Department of Energy
EPA	U.S. Environmental Protection Agency
FEMP	Fernald Environmental Management Project
FERMCO	Fernald Environmental Restoration Management Corp.
FS	feasibility study
IEMP	Integrated Environmental Monitoring Plan
IRDP	integrated remedial design package
LDR	land disposal restriction
MTR	minimum technology requirements
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
O&M	operations and maintenance
OEPA	Ohio Environmental Protection Agency
OSDF	on-site disposal facility
RA	remedial action
RCRA	Resource Conservation and Recovery Act
RD	remedial design
RI/FS	remedial investigation/feasibility study
ROD	record of decision
SEP	Site-Wide Excavation Plan
TBC	to be considered
TU	temporary unit

1.0 INTRODUCTION

1.1 PURPOSE

This remedial design (RD) work plan defines the activities and establishes the schedule for developing the final construction drawings, specifications, plans, and procurement documents necessary for the implementation of the Operable Unit 5 selected remedy. The selected remedy is described in the Record of Decision for Operable Unit 5 (DOE 1996) of the Fernald Environmental Management Project (FEMP), signed by the U.S. Environmental Protection Agency (EPA) on January 31, 1996.

Operable Unit 5 is one of five operable units at the FEMP, and encompasses the environmental media within and beyond the FEMP property boundary that are contaminated by releases from the four source operable units. Chronologically, Operable Unit 5 is the fourth of the five FEMP operable units to submit a RD Work Plan describing the design approach for implementing a final selected remedy. Operable Unit 3, the final operable unit to move through the process, is expected to issue a RD Work Plan following issuance of a record of decision (ROD) in late 1996. Operable Unit 3 issued an Interim ROD in 1994 followed by an implementation work plan and associated deliverables.

The operable unit concept was applied at the FEMP as a management approach to streamlining the remedial investigation/feasibility study (RI/FS) decision-making process, thereby expediting the initiation of site cleanup activities. The definitions of the five operable units at the FEMP were established considering factors such as geographic location, similarity in waste forms, and the availability of data on discrete waste units or areas as they proceeded through the RI/FS process. The current definitions of the five operable units, being a management approach for completing the site-wide RI/FS, do not necessarily represent the most prudent segmentation of site responsibility to efficiently perform remedial activities. This RD Work Plan presents an integrated approach to performing site remedial activities, frames the relative responsibilities of each of the operable units within this integrated site-wide remedial action strategy, and describes the specific goals and focus of the Operable Unit 5 RD process.

Integration of the five remedial actions is recognized as an ongoing process. The sequencing of disposal facility preparation, facilities decontamination and dismantlement, and final soil and groundwater remediation will be closely coordinated among all operable units throughout the remedial design and remedial action phases of site cleanup. In recognition of this needed site-wide integration, certain components of the Operable Unit 5 selected remedy will be addressed by separate design submittals being provided through the RD processes for the other FEMP operable units. More specifically, the preliminary and detailed design submittals for the on-property disposal facility are being provided in accordance with the delivery strategy and schedules embodied within the Operable Unit 2 Remedial Design Work Plan, submitted to EPA in December 1995.

This work plan is the primary document to be used in defining the implementation of the Operable Unit 5 remedial design activities and has been prepared in accordance with Section IX of the 1991 Amended Consent Agreement between the U.S. Department of Energy (DOE) and EPA and the Comprehensive Environmental Response, Compensation, and Liability Act of 1986, referred to as CERCLA. This work plan has also been prepared, where feasible, using the Superfund Remedial Design and Remedial Action Guidance (EPA 1986) and Guidance on EPA Oversight of Remedial Designs and Remedial Actions Performed by Potentially Responsible Parties (EPA 1990a).

1.2 SCOPE AND ROLE OF THE OPERABLE UNIT 5 REMEDY

The Operable Unit 5 remedy provides a permanent solution for addressing the contaminated environmental media at the site. The remedy provides the following key components; a detailed description of the remedy is presented in Section 2.0:

- Establishment of final cleanup levels for soil, sediment and groundwater
- Use of treatment to the extent practical to address the principal threats posed by the contaminated media
- Removal and permanent disposition of contaminated materials to an appropriate on- or off-property disposal facility
- Application of appropriate access controls to complement engineering measures taken to address site contaminants
- Restoration of the Great Miami Aquifer to full beneficial use within a reasonable time.

The goal of the RI/FS process for Operable Unit 5 was to determine the most prudent measures to be applied to contaminated environmental media, a legacy of the 38-year production and waste management mission of the Fernald facility. Coupled with this scope are attendant site-wide responsibilities fundamental to the successful accomplishment of the FEMP cleanup mission. These site-wide responsibilities include:

- Establish Final Cleanup Levels - The Operable Unit 5 ROD established the final remediation levels for site-wide environmental media including soil, sediment, surface water and groundwater. These final cleanup criteria will be applied within the boundaries of all FEMP operable units to ensure a consistent and protective site-wide remedy. Of notable exception is where a ROD for another operable unit established a more restrictive (i.e., lower) final remediation level for a discrete chemical or radiological constituent, the more restrictive criterion will be applied within the boundaries of that particular operable unit.

- Define Site-Wide Soil Cleanup Approach and Methods - The Operable Unit 5 RD and remedial action (RA) processes will establish the approach and methods to be applied site wide to implement and demonstrate attainment with final remediation levels for soil.

- Establish Site-Wide Discharge Limits to the Great Miami River - The Operable Unit 5 ROD established the mass- and concentration-based discharge limits for the river to be adopted by all FEMP operable units. The Operable Unit 5 RD/RA process will integrate the needs of all the operable units to ensure compliance with these discharge limits.

- Define Site-Wide Storm Water Management Approach - The Operable Unit 5 ROD established requirements for the site-wide management and treatment of contaminated storm water runoff. The Operable Unit 5 RD/RA process will integrate the needs of all the operable units to ensure compliance with these ROD provisions.

- Protect Sensitive Environmental Systems and Ecological Receptors - The Amended Consent Agreement delegated responsibility for the site-wide ecological risk assessment to Operable Unit 5. The RD/RA process for Operable Unit 5 will support this commitment.

- Maintain Baseline of Environmental Conditions - As the environmental media operable unit, Operable Unit 5 has conducted detailed characterization of the environmental conditions at the FEMP. This characterization data set, as supplemented throughout the remedy implementation, will serve as the baseline for evaluating the impacts, if any, that site-wide remedial actions may have on the environment due to atmospheric or liquid releases. The Operable Unit 5 RD/RA process will develop and implement an integrated site-wide environmental monitoring system to detect and evaluate the significance of these releases and assess the continued long-term protectiveness of the remedy.

- Facilitate Final Land Use Planning, Site Grading, Institutional Control Arrangements, and Delisting Obligations - The Operable Unit 5 RD/RA process will develop and implement the necessary field approaches and systems to achieve final site-wide remediation levels for soil and groundwater. On the basis of the projected land use, the Operable Unit 5 RD/RA process will support the institutional control arrangements required to complement the remedial actions to ensure the long-term protection of human health and the environment. The Operable Unit 5 RD/RA process will also support final site delisting from the National Priorities List (NPL) in a manner consistent with EPA policy and guidance.

1.3 INTEGRATED APPROACH TO SITE-WIDE RD/RA PLANNING

As part of the RI/FS process at the FEMP, an operable unit management approach was adopted to focus the characterization, alternative evaluation and remedy decision processes to achieve the most expeditious initiation of final remedial actions. With the RI/FS process nearing completion, the focus of the facility has now shifted toward the efficient completion of the RD/RA processes. One component of this process is the proper alignment of site-wide responsibilities and regulatory obligations across the five operable units to streamline inefficiencies within the project organizations. Discussions on the subject of integrated remedial planning were held with Ohio EPA (OEPA) and EPA in September 1995. Follow-up correspondence on this subject was transmitted to the agencies on October 11, 1995. The FEMP has proceeded with implementing an integrated remedial planning approach since introduction of the concept in the fall of 1995.

The following describes some necessary delineations of site-wide remedial planning responsibilities among the five FEMP operable units which are pertinent to the RD/RA strategy for Operable Unit 5. The discussion on the organizational approach to implementing these responsibilities is in Section 5.0, Project Management.

Operable Unit 5 - Environmental Media

The RD/RA process for Operable Unit 5 will focus on the design and implementation of site-wide soil and groundwater cleanup, site restoration and long-term environmental monitoring.

1 Section 3.0 of this work plan establishes a delivery schedule for remedial design documents to support the restoration of the Great Miami Aquifer. Also included in Section 3.0 is a delivery schedule for the submittal of a site-wide integrated environmental monitoring plan (IEMP). ~~This plan will address monitoring requirements for air, water and groundwater including groundwater monitoring associated with the on-site disposal facility (OSDF). Planning for source based monitoring, such as perimeter air monitoring surrounding an operable unit treatment system, will be provided as part of the RD/RA process for the individual operable unit (e.g., Operable Unit 4 Vitrification Plant Perimeter Air Monitoring).~~ The role of this plan is to address site-wide environmental monitoring and reporting requirements for air, biota, surface water/sediment, treated effluent, and groundwater including groundwater monitoring associated with the on-site disposal facility. The IEMP will also serve to define, where appropriate, any programmatic boundaries between the site-wide environmental monitoring activities envisioned for the IEMP and the project specific monitoring activities to be

conducted by the FEMP's individual remedial projects under their respective project-specific RD/RA documentation. The detailed description of the role of the IEMP and associated integration objectives will be provided in the IEMP itself.

Section 4.0 of this work plan provides a remedial design documentation delivery strategy for site-wide soil cleanup. Operable Unit 5 design documents will establish the methods to be applied site-wide for soil precertification sampling, excavation, and final certification sampling. These methods, once approved, will be used within the boundaries of all operable units to demonstrate attainment of final remediation levels. The Operable Unit 5 RD process will also produce planning documents to facilitate the final grading and restoration of the FEMP site following completion of soil and waste excavation activities. As a component of this final site restoration planning, the Operable Unit 5 design documents will define the access controls to be applied during remedy implementation and the final institutional control arrangements to help ensure the long-term protectiveness of the remedy.

Of special note is that the remedial design documents for Operable Unit 5 soil remediation will address the removal and disposition of at- and below-grade structures and piping systems located across the FEMP site. This responsibility includes the planning documents for the removal of all Operable Unit 3 building foundations, roadways, underground utilities and in-ground basins.

1 Site-wide planning for soil excavation will be addressed in the Site-wide Excavation Plan (SEP). The SEP will provide the management strategy necessary to govern site-wide soil remediation. Information to be included in the SEP will consist of methods and protocols that will be used during each phase of soil remediation. (The elements to be incorporated into the SEP are described in Section 4.2.2.) Individual area-specific integrated remedial design packages (IRDPs) will be developed for each remediation area and submitted in phases that correlate with the planned sequence of soil remediation. Phasing of these remedial design deliverables will accomplish two goals: 1) expedite remediation to accommodate the FEMP's accelerated remediation plan, and 2) incorporate lessons learned into the support plans to the SEP. The details concerning the scope, sequence, and schedule for each of these deliverables is provided in Section 4.2.3.

<u>Operable Unit 1 - Waste Pit Area</u>

The RD process for Operable Unit 1 will provide the necessary documents to support the off-site transport of waste materials destined for burial at a licensed commercial disposal facility. These documents would be used by all operable units contemplating disposal at this type of facility. The selected remedy for Operable Unit 5 envisions the disposal of excavated soil not meeting the waste acceptance criteria for the On-Site Disposal Facility at an off-site commercial disposal facility. Additionally, contaminated soil and debris generated by Operable Unit 5 remedial activities which are undertaken beyond the closure date of the On-Site Disposal Facility are expected to be transported off the FEMP for disposal.

The Operable Unit 1 design documents will plan the excavation of contaminated soil overlying and adjacent to the waste pits to the extent necessary to support the removal of the waste materials. Planning for any remaining excavations to achieve site-wide soil final remediation levels and for site restoration will be undertaken through the planning documents for Operable Unit 5.

Operable Unit 2 - Other Waste Units

The RD process for Operable Unit 2 will provide the necessary documents to support the design and construction of the On-Site Disposal Facility. The documents submitted in accordance with the Operable Unit 2 RD process will also establish the methods to be implemented across the site to demonstrate attainment of the waste acceptance criteria for the On-Site Disposal Facility. The waste units that Operable Unit 2 is remediating include the South Field, the Active and Inactive Flyash Piles, the Lime Sludge Ponds, and the Solid Waste Landfill.

Operable Unit 3 - Production Area

The RD process for Operable Unit 3 will provide the necessary planning and design documents for site-wide decontamination and dismantlement (D&D) of contaminated structures. As part of this scope, Operable Unit 3 will complete the necessary designs for the D&D of Operable Unit 5 wastewater treatment facilities including the biodenitrification system, the interim advanced wastewater treatment system, and the South Plume interim treatment system.

Operable Unit 4 - Silos 1 - 4

The RD process for Operable Unit 4 will provide the necessary planning for the removal of that contaminated soil which requires excavation to facilitate source removal activities. The planning for the excavation of remaining contaminated soil and the demonstration of attainment of final remediation levels, coupled with final site restoration within the boundaries of Operable Unit 4, will be completed as part of the Operable Unit 5 RD process.

1.4 WORK PLAN APPROACH

This RD Work Plan describes the selected remedy; reports on the status of design and remediation activities already underway within the scope of Operable Unit 5; outlines the major deliverables that will convey the design; and provides the overall schedule under which the RD activities will be conducted. To better align the RD process with the adopted organizational approach discussed in Section 5.0, the design work scope for Operable Unit 5 has been segmented into two principal components:

- Soil remediation
- Great Miami Aquifer restoration.

2 The Great Miami Aquifer restoration component, presented in Section 3.0, addresses all aspects of groundwater restoration including extraction and injection systems design and wastewater treatment system design. Also addressed is planning for an integrated environmental monitoring program, and the development of the FEMP's Site Closeout Report.

The soil remediation component, presented in Section 4.0, addresses all design aspects of site-wide soil cleanup including precertification and certification sampling and construction drawings and procurement packages. Also addressed are final grading and land use, institutional controls and natural resource management.

The completion of required soil and groundwater remedial activities at the FEMP site are expected to take in excess of 10 years. It is expected that during this time period considerable experience will be gained necessitating refinements in the remedial strategy for groundwater and soil. To incorporate these changes, amendments will be issued to this work plan and/or the discrete design deliverables described in this plan.

1.5 WORK PLAN ORGANIZATION

The Remedial Design Work Plan for Remedial Actions at Operable Unit 5 is comprised of five sections. The remaining sections and their contents are as follows:

Section 2.0 Selected Remedy - includes a brief description of the selected remedy for Operable Unit 5

Section 3.0 Remedial Design Strategy for Aquifer Restoration - provides the design strategy and a brief abstract and submittal schedule for design deliverables for addressing contaminated portions of the Great Miami Aquifer, surface water, and site-wide integrated environmental monitoring

Section 4.0 Remedial Design Strategy for Soil Remediation - provides the design strategy and a brief abstract and submittal schedule for design deliverables for addressing contaminated soil, sediment and perched water zones at the site

Section 5.0 Project Management - includes a description of the organizational approach to be applied to implement the remedial design for Operable Unit 5.

2.0 SELECTED REMEDY

The selected remedy for Operable Unit 5 provides for the protection of existing and projected future human and environmental receptors through the implementation of remedial actions involving: the excavation of soil, sediment and perched water zones containing concentrations of COCs above the final remediation levels; on-property disposal of the excavated materials in an engineered disposal facility; restoration of the Great Miami Aquifer through pump and treat technologies to attain the final remediation levels; collection of contaminated storm water; treatment of collected storm water and process wastewater generated through remedial activities and recovered contaminated groundwater to the extent necessary to ensure that discharge limits are attained and final remediation levels for the receiving surface water streams are not exceeded; long-term groundwater monitoring; and continued federal ownership of the FEMP, or portions thereof, to the extent necessary to ensure the continued protection of human health and the environment. This section provides an abbreviated summary of the selected remedy. See Section 9.0 of the Operable Unit 5 ROD (1996) for a complete description.

The selected remedy provides for the on-property disposal of contaminated materials originating on site. Contaminated materials to be placed in the On-Site Disposal Facility (following any necessary demonstration of the attainment of waste acceptance criteria) include: contaminated soil and sediment; water and wastewater treatment sludges, spent resins and filter media; miscellaneous rubble from the construction, demolition and maintenance of water, wastewater and storm water conveyance, equalization, and treatment systems; investigation-derived waste from Operable Unit 5 investigation, sampling and analysis efforts; miscellaneous waste (i.e., respirators, protective clothing, etc.,) generated consequentially to the planning and implementation of remedial actions; and sludges and other wastes derived during the conduct of engineering studies (i.e., treatability, proof-of-process, etc.,) on Operable Unit 5 materials.

The remedy provides an explicit prohibition to the placement of any waste generated off of the FEMP in the On-Site Disposal Facility. Specifically excluded from this prohibition are laboratory wastes generated at off-site facilities resulting directly from the chemical, radiological and engineering analysis of FEMP waste materials/contaminated media or wastes generated at off-site facilities during the conduct of treatability or demonstration-type studies on FEMP material.

2.1 KEY COMPONENTS

2 The remedy consists of these key components: soil and sediment; perched water; regional groundwater aquifer; storm water/wastewater; treatment of discharges; measures to minimize environmental impacts; institutional controls/monitoring; the corrective action management unit (CAMU) rule; and community involvement. Each is discussed below. Table 2-1 lists each of the key components of the OU5 remedy and provides a cross-reference identifying the specific section of the RD Work Plan that addresses each key component.

2 **TABLE 2-1**

REMEDY COMPONENT - REMEDIAL DESIGN WORK PLAN CROSS REFERENCE

Remedy Component	RD Work Plan Section Reference
Soil and Sediment	4.2.2 and 4.2.3
Perched Water	4.2.2 and 4.2.3
Regional Groundwater Aquifer	3.0, 3.3, 3.3.1, 3.3.3-3.3.7, 3.3.9, 3.4, and 3.5
Stormwater/Wastewater	3.3.2, 4.2.2, 4.2.3
Treatment of Discharges	3.3.8
Measures to minimize environmental impacts	4.2.2
Institutional Controls/Monitoring	3.3.9, 4.0
The Corrective Action Management (CAMU) Rule	4.2.2
Community Involvement	2.1.9, 5.0

2.1.1 Soil and Sediment

Soil and sediment exceeding final remediation levels will be excavated with conventional construction equipment. Figure 2-1 provides a planning-level estimate of the projected footprint of soil and sediment requiring excavation as part of the remedy. Excavation is projected to generally proceed from the northeastern portion of the facility toward the southwest to take maximum advantage of natural drainage patterns to minimize the potential for the recontamination of previously excavated areas resulting from contact with contaminated runoff. Appropriate mitigative measures will be used during excavation activities to minimize the resuspension of dust particles. Excavation will continue

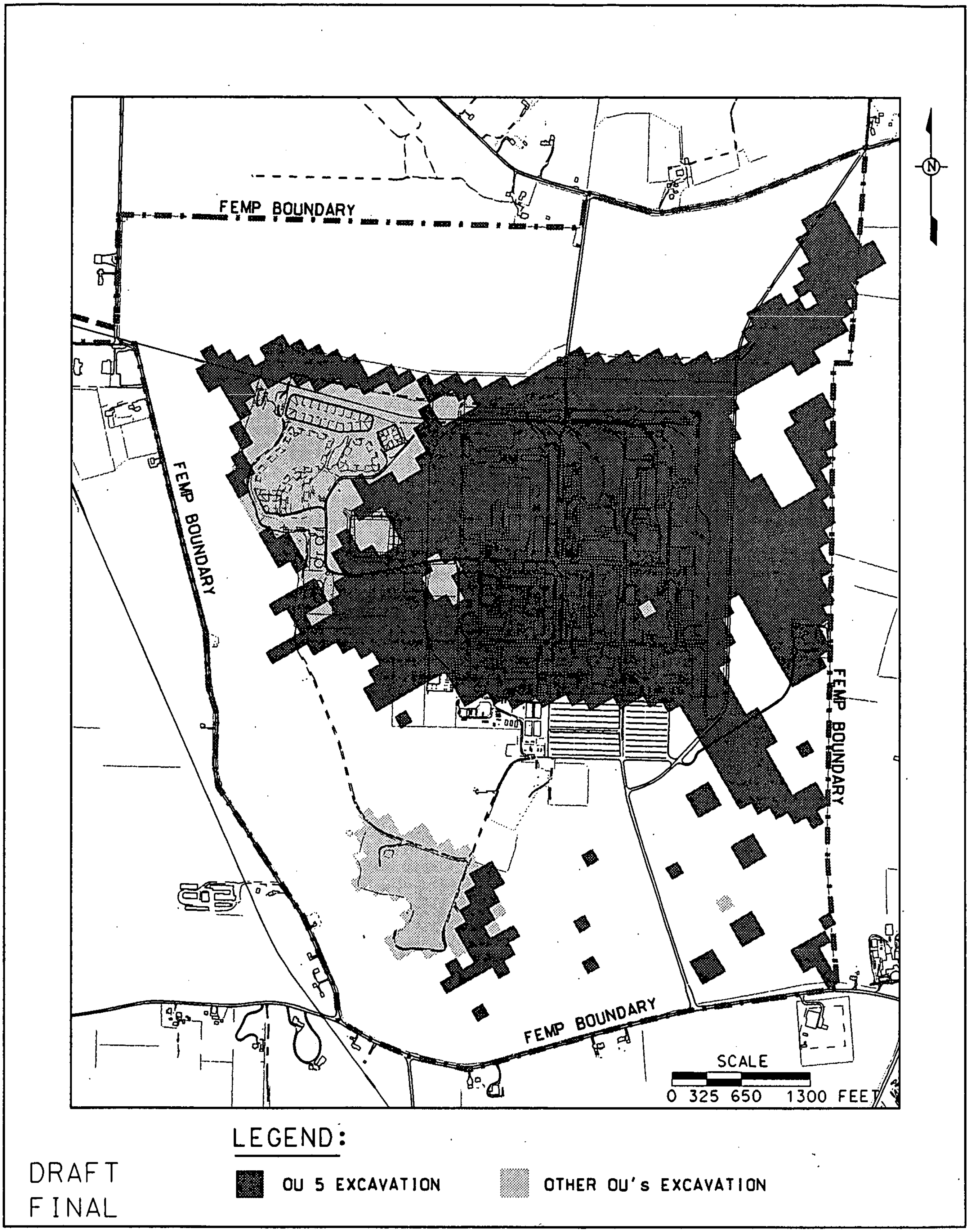

FIGURE 2-1. EXCAVATION FOOTPRINT FOR SELECTED REMEDY

until a certification sampling program indicates with reasonable confidence that the concentrations of contaminants at the entire site are statistically less than the final remediation levels. Excavated areas will be regraded, backfilled (as necessary) and a vegetative cover reestablished. Environmental and worker health and safety monitoring will be provided during excavation activities.

Figure 2-1 indicates the need for substantial excavation activities in the former production area. Consequently, a necessary integration of remedial activities must take place between Operable Units 3 and 5. The excavation of soil within this area must be properly sequenced with building demolition activities. It is envisioned that the excavation of contaminated soil will take place coincidental with building foundation and subsurface utility removals.

4 It is anticipated that soil contamination above the FRLs (and associated perched groundwater zones)
6 will be remediated site-wide within the 10 year scenario, even if the AWWT facility, service roads,
or other remediation facilities remain beyond the 10 years. Deliverables for addressing the possible remediation of soil beneath the AWWT or other areas with schedules potentially extending beyond the 10 year plan would be included in the applicable pre-final Integrated Remedial Design Package (IRDP). Certification sampling and remedial excavation around these areas will be performed to the extent feasible during the 10 year remediation scenario without compromising the structural integrity of any actively operating facility. Additional certification sampling will be completed when the structures are dismantled to confirm that FRLs are attained. Excavated soil and debris will be shipped off-site, if needed, and assuming that the on-site disposal facility is closed.

5 Excavated soil will be placed in the On-Site Disposal Facility using conventional construction equipment. The facility will be situated at the location on the FEMP property that exhibits the most suitable hydrogeologic characteristics for the protection of human health and the environment, as described in Section 4. The disposal facility will be designed such that the contents are placed at or above grade with minimal potential for human or biotic intrusion. The disposal facility design will include an engineered lining and capping system to minimize water infiltration and provide for the long-term protection of the Great Miami Aquifer. ~~Contaminant specific waste acceptance criteria have been established for the disposal facility.~~ Contaminant-specific waste acceptance criteria for the on-site disposal facility have been established in the OU5 ROD and are discussed in Section 2.2. Soil exhibiting contaminant concentrations that exceed these waste acceptance criteria will be shipped off site for disposal. Off-site disposal will be conducted consistent with the terms of the Amended

Consent Agreement and EPA's Off-Site Rule. In the event off-site disposal capacity becomes unavailable or cost prohibitive, physical or chemical techniques will be examined to treat the soil to attain the waste acceptance criteria. Approval will be sought from EPA before the application of any soil treatment technology.

2.1.2 Perched Water

Perched water zones presenting an unacceptable threat (i.e., having a cross-media impact to the Great Miami Aquifer that would produce concentrations in groundwater exceeding the existing or proposed MCLs) to the underlying aquifer will be excavated with the contaminated soil. Excavation will take place using conventional excavation equipment. Perched water zones requiring excavation as part of the selected remedy are included in Figure 2-1 which delineates the projected footprint of excavations for soil and sediment. Considerations associated with the excavation, staging and soil transportation process are as discussed above for soil and sediment. Excavated subsurface soil removed to address perched water may, if necessary, be temporarily staged at an appropriate location to permit excess liquids to drain. Such drainage and water collected during perched water zone removal will be transferred to the advanced wastewater treatment (AWWT) facility for treatment before discharge.

Excavated subsurface soil will be placed in the On-Site Disposal Facility. Subsurface soil exhibiting contaminant concentrations which exceed the waste acceptance criteria for the disposal facility will be shipped off site for disposal. Considerations for the on-property disposal of contaminated material are as previously discussed for soil and sediment.

In the event field conditions preclude the ability to effectively implement the excavation option to address a given perched water zone, limited application of pumping or trenching may be used to attain necessary remediation levels.

2.1.3 Regional Groundwater Aquifer

11 Areas of the Great Miami Aquifer exceeding final remediation levels will be restored through extraction methods. The areas of the aquifer requiring remediation are identified in Figure 2-2. As noted on Figure 2-2, the administrative boundary for aquifer restoration to be addressed by this remedial design work plan is north of the Paddys Run Road Site Plume. DOE's role and involvement in OEPA's ongoing assessment and/or cleanup of the Paddys Run Road Site plume, if any, would be

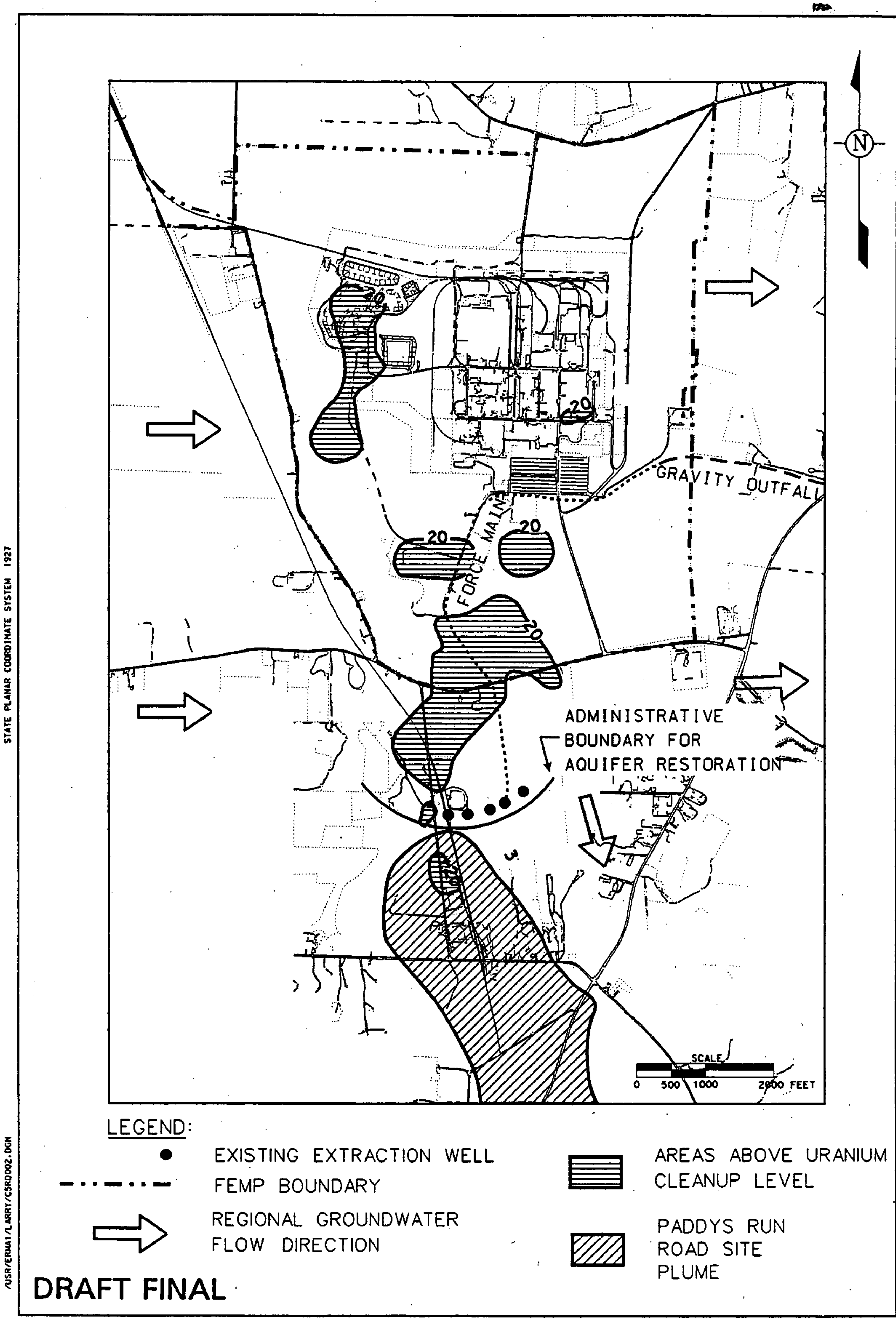

FIGURE 2-2. AREAS OF THE GREAT MIAMI AQUIFER REQUIRING REMEDIATION

defined separately as part of the Paddys Run Road Site response obligations and in accordance with the Paddys Run Road Site project schedule.

Monitoring will continue south of the administrative boundary as identified in the forthcoming IEMP, until such time as the need for action is established and implemented. Modeling conducted to support the feasibility study (FS) identified the need for 28 extraction wells distributed across the affected areas of the aquifer. These 28 wells are divided into four extraction well systems and are identified in Figure 2-3. The final number and configuration of these extraction wells will be established through the remedial design process outlined in Section 3.0.

The FEMP presently has an extraction well network located at the leading edge of the South Plume, installed as part of a removal action. These wells are an integral part of the required recovery well system for the selected remedy. The FEMP is in the process of installing additional extraction wells in the South Field that are part of the system contemplated by the selected remedy.

Modeling conducted for the FS demonstrated that a combined maximum pumping rate of 4000 gpm from the extraction well system will be required for up to 27 years to fully attain the final remediation levels throughout all portions of the aquifer. The DOE has committed, as part of the selected remedy, to examine enhancement technologies to improve the extraction well system described in the FS Report. One such technique is injection of treated or clean water into the aquifer to enhance the flushing effect. Such a technique may reduce the projected time period to achieve full aquifer restoration. Enhancement techniques will be examined during remedial design as outlined in Section 3.0 and will be applied only with the specific approval of EPA.

2.1.4 Storm Water/Wastewater

8 The FEMP maintains a storm water collection system which includes conveyance systems and
9 retention basins. This system is designed to prevent contaminated storm water from entering the storm sewer outfall ditch and Paddys Run. ~~As part of the selected remedy, the FEMP will continue to operate this system until such time as soil final remediation levels are attained on a site wide basis or until jointly deemed unnecessary by DOE and EPA.~~ As remediation of the site (and the former production area) progresses, the storm water collection system will be decommissioned in stages to ensure continued storm water collection from the portions of the site that have not been remediated. Run-on and run-off controls will be addressed in the SEP, as described in Section 4.2.2. Storm water

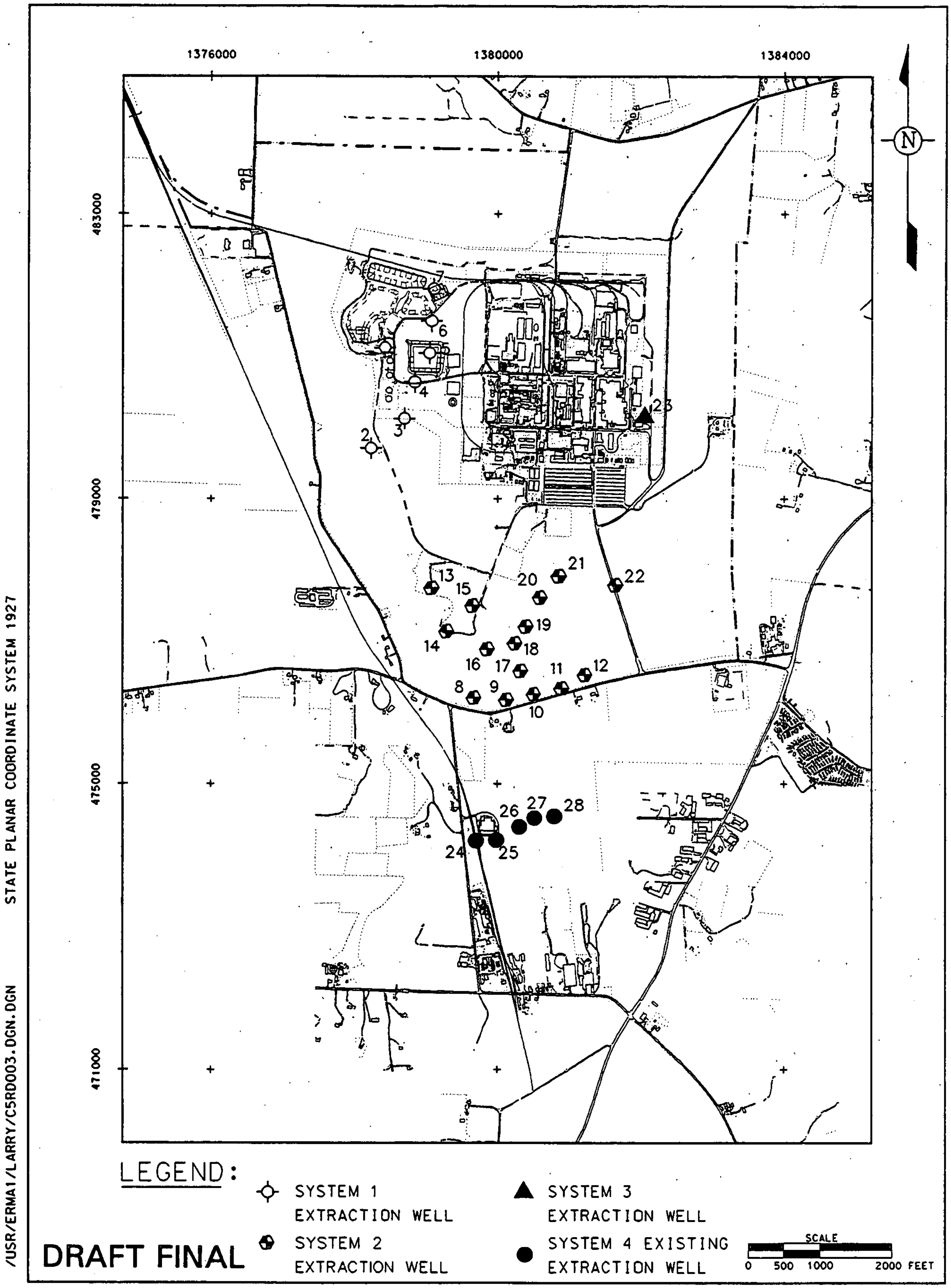

FIGURE 2-3. PROJECTED EXTRACTION WELL LOCATIONS

will be managed in open excavations, as practical, through the use of standard engineering techniques. Run-on and run-off controls will be addressed in the SEP, as described in Section 4.2.2.

Sanitary and process wastewater continue to be generated at the FEMP as a result of the occupancy of the site by the work force and due to ongoing cleanup initiatives such as building decontamination. Additionally, process wastewater is expected to be generated as a consequence of the implementation of remedial actions for Operable Unit 5 and the other four operable units. The FEMP will continue to collect and direct this wastewater for treatment, as necessary, as part of the selected remedy.

2.1.5 Treatment of Discharges

The FEMP will construct and operate the treatment facilities necessary to attain mass-based discharge limits to the Great Miami River. Storm water, wastewater and groundwater will be treated in existing and expanded facilities such that the monthly average concentration in the combined discharges to the river does not exceed the final remediation levels for surface water in Paddys Run or the Great Miami River. Additionally, treatment will be applied such that the total mass and blended effluent concentration of uranium discharged to the Great Miami River does not exceed 600 pounds per year or 20 ppb, as further defined below. Available wastewater treatment capacity will be applied first to highest concentration streams to effectively minimize the concentration and mass of uranium present in the blended effluent discharged to the Great Miami River.

DOE Treatment will be applied to storm water, wastewater and recovered groundwater to the extent necessary to limit the total mass of uranium discharged through the FEMP outfall to the Great Miami River to 600 pounds per year and to ensure that the levels necessary to ensure the protection of human health (i.e., 530 ppb total uranium outside the mixing zone) for concentrations of uranium and other constituents of concern (COCs) in the Great Miami River are not exceeded. This mass-based discharge limit became effective upon issuance of the ROD. Additionally, the necessary treatment will be applied to these streams to limit the concentration of total uranium in the blended effluent to the Great Miami River to 20 ppb. The 20 ppb discharge limit for uranium will be based on a monthly average and will become effective January 1, 1998. To attain these mass-based and concentration-based discharge limits, DOE has committed to expanding the ~~design capacity of the~~ existing advanced wastewater treatment facility by ~~a minimum of~~ an additional design related capacity of 1800 gpm.

Treatment sludges will be placed in the On-Site Disposal Facility to the extent they attain the waste acceptance criteria for the facility. Sludges not attaining the waste acceptance criteria will be transported off site for disposal. Off-site disposal will be conducted consistent with the terms of the Amended Consent Agreement and EPA's Off-Site Rule. In the event off-site disposal capacity becomes unavailable or cost prohibitive, physical or chemical techniques will be examined to treat the sludges to attain the waste acceptance criteria. Approval will be sought from EPA before the application of any sludge treatment technology.

2.1.6 Measures to Minimize Environmental Impacts

All practical measures will be employed to minimize environmental impacts during implementation of the Operable Unit 5 remedial action. DOE has factored environmental impacts into the decision-making process for the remedial action as discussed below.

Measures to minimize environmental impacts to on-property natural resources (e.g., wildlife and wildlife habitat, wetlands, floodplains, surface water, groundwater) have been identified in the final Operable Unit 5 FS Report and Proposed Plan (DOE 1995a, 1995c). Remedial activities are not expected to alter flow patterns or uses of the 100- and 500-year floodplain of Paddys Run at the FEMP. The implementation of engineering and/or natural controls (e.g., silt fences and hay bales) will minimize indirect impacts such as runoff and sediment deposition to the floodplain.

Impacts to on-property vegetation and wildlife habitat will result from the removal of contaminated soil and sediment and construction of support facilities. Approximately 115 acres of on-property grassland will be impacted and later restored by revegetation.

Approximately 7.5 acres of early to mid-successional woodlands, 16.5 acres of riparian habitat along 1375 feet of Paddys Run, and 50 acres of pine plantation will be impacted. These impacts will be offset by implementing mitigative measures such as revegetation with native tree species in consultation with appropriate federal and state agencies.

Because habitat of the Sloan's crayfish, listed as threatened in Ohio, could be impacted from increased sediment load into Paddys Run, control measures will be used to minimize the impact of sediment deposition to Sloan's crayfish habitat. If necessary, Sloan's crayfish will be relocated upstream of remedial activities in pooled sections of Paddys Run.

A total of approximately 10 acres of wetlands will be impacted as a result of the implementation of the Operable Unit 5 remedial action. Mitigation for wetland impacts will be determined using the Section 404 (b)(1) guidelines of the Clean Water Act. The need for compensatory mitigation will be determined after all practicable steps to avoid and minimize adverse impacts to wetlands have been applied.

To avoid impacts to cultural resources, Phase 1 and 2 archaeological surveys will be performed to determine the presence of historic and prehistoric (archaeological) sites eligible for the National Register of Historic Places. If a remedial action is found to have an adverse impact, consultation with the Advisory Council on Historic Preservation and the State Historic Preservation Office would be required under the National Historic Preservation Act, Section 106, process. If an adverse impact to a cultural resource cannot be avoided, a memorandum of agreement or programmatic agreement would be negotiated among the Advisory Council, the State Historic Preservation Office, and DOE which will identify mitigative measures.

The natural resource Trustees for the FEMP site include the Department of the Interior, DOE, and OEPA. The Trustees' role is to act as guardian for natural resources at or near the FEMP site that may have been injured as a result of a release of a hazardous substance or an oil spill. Negotiations with the Trustees are ongoing. Input from the Trustees is anticipated to be factored into the natural resource mitigation activities contemplated by the Operable Unit 5 selected remedy.

2.1.7 Institutional Controls/Monitoring

One element of the selected remedy that will be used to ensure protectiveness is institutional controls, including continued access controls at the site during the remediation period, alternate water supplies to affected residential and industrial wells, continued federal ownership of the On-Site Disposal Facility and necessary buffer zones, and deed restrictions to preclude residential and agricultural uses of the remaining regions of the FEMP property. Additionally, proper notifications, as mandated by CERCLA, will be provided before the transfer of any federal real property which is known to contain or have been used in the processing of hazardous substances. These measures will minimize the potential for human exposure to contaminated soil and groundwater during the implementation of site-wide remedial actions, and to the contaminated material contained in the on-property disposal facility following completion of remedial activities at the site. Specific institutional control measures to be implemented at the site will be established during the remedial design process outlined in Section 4.0.

The Fernald Citizens Task Force issued recommendations regarding future use of the FEMP property in May of 1995. The Task Force recommended that the area of the FEMP containing the disposal facility and associated buffer zone remain under the continued ownership of the federal government. Additionally, the Task Force recommended that the remaining portions of the FEMP property be made available for the uses that are deemed most beneficial to the surrounding communities. The Task Force encouraged DOE to consult with the local communities to establish their preferences for future use and ownership of these areas of the site. Consistent with this recommendation, the DOE will work with the local communities during remedial design on establishing a final land use and ownership plan for the FEMP property.

Long-term environmental monitoring will also be conducted as part of the selected remedy. This monitoring will be designed to detect and quantify, to the extent practical, releases from the site attributable to the implementation of remedial actions and will include monitoring of the air, surface water and groundwater pathways. Monitoring devices providing real-time or near real-time data will be evaluated and applied, if practical. Monitoring will also be conducted following the completion of remedial actions to assess the continued performance of the remedy; groundwater monitoring will be continued for, at a minimum, the area of the disposal facility. The type and frequency of monitoring activities will be determined during the remedial design process outlined in Section 3.0.

Long-term maintenance will be provided as part of the selected remedy for the On-Site Disposal Facility to ensure the continued protectiveness of the remedy. Additionally, reviews will be conducted every five years by EPA to evaluate the effectiveness of the remedy and the continued attainment of the media-specific final remediation levels (see Section 2.2). If, upon such review, it is the judgment of EPA that additional action or modification of remedial actions is appropriate in accordance with Section 104 or 106 of CERCLA, DOE may be required to implement additional actions or modify the existing action.

2.1.8 Corrective Action Management Unit Rule

The CAMUs and Temporary Units (TUs) Final Rule was promulgated to meet the objectives of a cleanup program under the Resource Conservation and Recovery Act (RCRA), as amended.

Management of remediation (and investigation) waste within a CAMU is not subject to the strict RCRA Subtitle C requirements. Specifically, waste management activities within a CAMU are not subject to land disposal restrictions (LDRs) and minimum technology requirements (MTRs).

The CAMU rule is identified as an applicable requirement for Operable Unit 5. The boundaries of the CAMU are designated to be coincident with the FEMP property boundaries and encompass the On-Site Disposal Facility. Consolidation or management of on-site remediation wastes into or within the CAMU will not constitute the creation of a unit subject to MTRs and will not invoke LDRs.

DOE, EPA, and OEPA reviewed remedial investigation data and site process knowledge to determine if areas of soil exhibiting a RCRA characteristic could be identified which offered a reasonable opportunity for the application of a cost-effective level of treatment before disposal. This review was conducted to further satisfy the regulatory preference for treatment contained in Section 264.552 of the CAMU rule. The review identified six geographic areas of the FEMP where a reasonable potential exists for the presence of RCRA characteristic waste in soil. These areas are summarized in the remedy description for soil provided in Section 9.1.1 of the Operable Unit 5 ROD (DOE 1996). Recognizing that a protective remedy has been selected for Operable Unit 5 soil, coupled with the desire on the part of all parties to satisfy the regulatory preference for treatment, consensus has been reached by DOE, EPA, and OEPA that these six geographic areas represent the locations where a reasonable opportunity exists for cost-effective treatment of RCRA characteristic soil. DOE is committed to identifying, segregating and treating, as necessary, contaminated soil from within the six geographic areas that exhibits one or more RCRA characteristics.

2.1.9 Community Involvement

12 The DOE and EPA are committed to continuing the active community involvement program currently in place at the FEMP throughout the duration of remedial activities and post-remediation monitoring at the site. This program will include: public meetings; public comment periods (as needed); newsletters; tours; and small focused group sessions assessing specific cleanup issues.

2.2 REMEDIAL ACTION OBJECTIVES AND CLEANUP LEVELS

Remedial action objectives were developed in accordance with the NCP and EPA guidance with the intention of setting goals to ensure the protection of human health and the environment. The objectives are designed to mitigate the potential adverse effects of site contaminants present in environmental media.

10 The remedial action objectives for Operable Unit 5 include eliminating, or reducing to acceptable levels, the potential for human or ecological receptors to come into contact with contaminated environmental media and prevention of off-property migration of contaminants in excess of the contaminant-specific final remediation levels. From these objectives, final remediation levels were developed for each of the environmental media to ensure that remedial actions reduce the projected risk to humans and ecological receptors to protective levels consistent with anticipated future uses of the land or water. The environmental media subject to the final remediation levels are soil, Great Miami Aquifer groundwater, surface water in Paddy's Run and the Great Miami River, and sediment. The final remediation levels for each of these media are presented in Tables 2-2, 2-3, 2-4, and 2-5.

The Fernald Citizens Task Force has made the following recommendations for consideration by the DOE regarding the future use of the FEMP property:

- The area of the FEMP containing the disposal facility and associated buffer zone remain under the continued ownership of the federal government

- The remaining portions of the FEMP property be made available for uses that are the most beneficial to the surrounding communities

- Any agricultural or residential uses of the FEMP property be prohibited.

10 The final remediation levels ~~presented in Section 9.0 of the ROD~~ in Tables 2-2 through 2-5 have been designed to be consistent with these recommendations. Additionally, the FEMP is committed to the application of as low as reasonably achievable (ALARA) goals during site cleanup. The remedial design packages for Operable Unit 5 will include the appropriate level of ALARA evaluations.

10 Operable Unit 5 is the fourth of the five FEMP operable units to proceed through the remedy selection process. The three FEMP operable units (i.e., 1, 2 and 4) preceding Operable Unit 5 similarly established soil remediation levels in their RODs for the constituents of concern occurring within the respective boundaries of these source operable units. The final remediation levels in these RODs were derived on the basis of operable unit-specific information regarding the physical, chemical, radiological and geochemical characteristics of the contaminants and the environmental setting in which they reside. Where the final soil remediation level for a specific constituent

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TABLE 2-2

FINAL REMEDIATION LEVELS FOR SOIL

Constituent	On-Property Final Remediation Levels	Off-Property Final Remediation Levels
Radionuclides (pCi/g)		
Cesium-137+1d	1.4×10^{0}	8.2×10^{-1}
Neptunium-237+1d	3.2×10^{0}	4.9×10^{-1}
Lead-210+2d	3.8×10^{1}	2.2×10^{0}
Plutonium-238	7.8×10^{1}	9.3×10^{0}
Plutonium-239/240	7.7×10^{1}	9.0×10^{0}
Radium-226+de	1.7×10^{0}	1.5×10^{0}
Radium-228+de	1.8×10^{0}	1.4×10^{0}
Strontium-90+de	1.4×10^{1}	6.1×10^{-1}
Technetium-99	3.0×10^{1}	1.0×10^{0}
Thorium-228+de	1.7×10^{0}	1.5×10^{0}
Thorium-230	2.8×10^{2}	8.0×10^{1}
Thorium-232+de	1.5×10^{0}	1.4×10^{0}
Uranium, total (K_l=325 L/kg[a]) (ppm)	8.2×10^{1}	5.0×10^{1}
Uranium, total (K_l=15 L/kg[a]) (ppm)	2.0×10^{1}	NA
Chemicals (mg/kg)		
Acetone	4.3×10^{4}	4.3×10^{-1}
Antimony	9.6×10^{1}	6.1×10^{-1}
Aroclor-1254	1.3×10^{-1}	4.0×10^{-2}
Aroclor-1260	1.3×10^{-1}	4.0×10^{-2}
Arsenic	1.2×10^{1}	9.6×10^{0}
Barium	6.8×10^{4}	1.2×10^{2}
Benzene	8.5×10^{2}	4.3×10^{-1}
Benzo(a)anthracene	2.0×10^{1}	1.6×10^{-1}
Benzo(a)pyrene	2.0×10^{0}	9.0×10^{-2}
Benzo(b)fluoranthene	2.0×10^{1}	1.6×10^{-1}
Benzo(k)fluoranthene	2.0×10^{2}	9.0×10^{-2}
Beryllium	1.5×10^{0}	6.2×10^{-1}
Bis(2-chloroisopropyl)ether	4.2×10^{2}	2.0×10^{-1}
Bis(2-ethylhexyl)phthalate	8.2×10^{2}	2.6×10^{1}
Boron	7.4×10^{3}	4.0×10^{0}
Bromodichloromethane	4.0×10^{0}	1.8×10^{-1}
Bromoform	3.1×10^{1}	1.6×10^{0}
Bromomethane	8.2×10^{3}	2.4×10^{-2}
Cadmium	8.2×10^{1}	9.1×10^{-1}
Carbazole	1.2×10^{1}	3.1×10^{0}
Carbon disulfide	5.0×10^{3}	6.2×10^{0}
Carbon tetrachloride	2.1×10^{0}	9.1×10^{-2}

TABLE 2-2
(Continued)

Constituent	On-Property Final Remediation Levels	Off-Property Final Remediation Levels
Chemicals (Cont.) (mg/kg)		
Chlordane	1.9×10^{-1}	3.8×10^{-2}
Chlorobenzene	3.4×10^{2}	1.9×10^{0}
Chloroform	4.5×10^{1}	5.0×10^{-1}
Chromium VI	3.0×10^{2}	1.1×10^{1}
Chrysene	2.0×10^{3}	1.6×10^{1}
Cobalt	7.4×10^{2}	2.6×10^{1}
Copper	2.2×10^{5}	2.0×10^{1}
Cyanide	1.2×10^{5}	8.0×10^{-1}
Dibenzo(a,h)anthracene	2.0×10^{0}	1.6×10^{-3}
3,3'-Dichlorobenzidine	5.5×10^{-1}	2.0×10^{-1}
1,2-Dichloroethane	1.6×10^{-1}	1.3×10^{-1}
1,1-Dichloroethene	4.1×10^{-1}	5.9×10^{-2}
Dieldrin	1.5×10^{-2}	8.8×10^{-3}
Di-n-octylphthalate	1.1×10^{3}	2.0×10^{-1}
Ethylbenzene	5.1×10^{3}	1.0×10^{-3}
Fluoride	7.8×10^{4}	8.5×10^{2}
Heptachlorodibenzofuran	8.8×10^{-4}	5.0×10^{-5}
Heptachlorodibenzo-p-dioxin	8.8×10^{-4}	5.0×10^{-5}
Indeno(1,2,3-cd)pyrene	2.0×10^{1}	1.6×10^{-2}
Lead	4.0×10^{2}	4.0×10^{2}
Manganese	4.6×10^{3}	1.4×10^{3}
Mercury	7.5×10^{0}	3.0×10^{-1}
Methyl-2-pentanone	2.5×10^{3}	9.4×10^{-1}
Methylene chloride	3.7×10^{1}	6.3×10^{-1}
4-Methylphenol	2.5×10^{2}	2.7×10^{-1}
Molybdenum	2.9×10^{3}	1.3×10^{1} [a]
Nickel	1.5×10^{4}	3.4×10^{1}
4-Nitroanaline	1.5×10^{2}	8.0×10^{-1}
N-nitrosodiphenylamine	5.1×10^{1}	1.3×10^{1}
N-nitrosodipropylamine	2.0×10^{-1}	2.0×10^{-1}
Octachlorodibenzofuran	8.8×10^{-3}	1.0×10^{-5}
Octachlorodibenzo-p-dioxin	8.8×10^{-3}	1.0×10^{-5}
Pentachlorophenol	2.3×10^{0}	9.7×10^{-1}
Selenium	5.4×10^{3}	2.5×10^{0}
Silver	2.9×10^{4}	1.0×10^{0}
Tetrachloroethene	3.6×10^{0}	1.0×10^{0}
Thallium	9.1×10^{1}	1.0×10^{0}

TABLE 2-2
(Continued)

Constituent	On-Property Final Remediation Levels	Off-Property Final Remediation Levels
Chemicals (Cont.) (mg/kg)		
Toluene	1.0×10^{5}	2.7×10^{1}
Tributyl phosphate	2.5×10^{2}	2.9×10^{0}
1,1,2-Trichloroethane	4.3×10^{0}	1.9×10^{-1}
Trichloroethene	2.5×10^{1}	1.5×10^{0}
Vanadium	5.1×10^{3}	5.8×10^{1}
Vinyl chloride	1.3×10^{-1}	2.3×10^{-3}
Xylenes, total	9.2×10^{5}	4.0×10^{2}
Zinc	1.2×10^{5}	8.2×10^{1}

[a] K_l = leaching coefficient

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TABLE 2-3

FINAL REMEDIATION LEVELS FOR GREAT MIAMI AQUIFER GROUNDWATER

Constituent	Final Remediation Levels
Radionuclides (pCi/L)	
Neptunium-237(+1d)	1.0×10^{0}
Radium-226(+8d)	2.0×10^{1}
Radium-228(+1d)	2.0×10^{1}
Strontium-90(+1d)	8.0×10^{0}
Technetium-99	9.4×10^{1}
Thorium-228(+7d)	4.0×10^{0}
Thorium-230	1.5×10^{1}
Thorium-232+(10d)	1.2×10^{0}
Uranium, total (mg/L)	2.0×10^{-2}
Chemicals (mg/L)	
Alpha-chlordane	2.0×10^{-3}
Antimony	6.0×10^{-3}
Aroclor-1254	2.0×10^{-4}
Arsenic	5.0×10^{-2}
Barium	2.0×10^{0}
Benzene	5.0×10^{-3}
Beryllium	4.0×10^{-3}
Bis(2-chloroisopropyl)ether	5.0×10^{-3}
Bis(2-ethylhexyl)phthalate	6.0×10^{-3}
Boron	3.3×10^{-1}
Bromodichloromethane	1.0×10^{-1}
Bromomethane	2.1×10^{-3}
Cadmium	1.4×10^{-2}
Carbazole	1.1×10^{-2}
Carbon disulfide	5.5×10^{-3}
Chloroethane	1.0×10^{-3}
Chloroform	1.0×10^{-1}
Chromium VI	2.2×10^{-2}
Cobalt	1.7×10^{-1}

TABLE 2-3
(Continued)

Constituent	Final Remediation Levels
Chemicals (Cont.) (mg/L)	
Copper	1.3×10^{0}
1,1-Dichloroethane	2.8×10^{-1}
1,1-Dichloroethene	7.0×10^{-3}
1,2-Dichloroethane	5.0×10^{-3}
Fluoride	8.9×10^{-1}
Lead	2.0×10^{-3}
Manganese	9.0×10^{-1}
Mercury	2.0×10^{-3}
Methylene chloride	5.0×10^{-3}
4-Methylphenol	2.9×10^{-2}
Molybdenum	1.0×10^{-1}
Nickel	1.0×10^{-1}
Nitrate	1.1×10^{1}
4-Nitrophenol	3.2×10^{-1}
Octachlorodibenzo-p-dioxin	1.0×10^{-7}
Selenium	5.0×10^{-2}
Silver	5.0×10^{-2}
2,3,7,8-Tetrachlorodibenzo-p-dioxin	1.0×10^{-5}
Trichloroethene	5.0×10^{-3}
Vanadium	3.8×10^{-2}
Vinyl chloride	2.0×10^{-3}
Zinc	2.1×10^{-2}

TABLE 2-4

FINAL REMEDIATION LEVELS FOR SURFACE WATER IN PADDYS RUN AND THE GREAT MIAMI RIVER*

Constituent	Final Remediation Levels
Radionuclides (pCi/L)	
Cesium-137+1d	1.0×10^{1}
Neptunium-237+1d	2.1×10^{2}
Lead-210+2d	1.1×10^{1}
Plutonium-238	2.1×10^{2}
Plutonium-239/240	2.0×10^{2}
Radium-226+8d	3.8×10^{1}
Radium-228+1d	4.7×10^{1}
Strontium-90+1d	4.1×10^{1}
Technetium-99	1.5×10^{2}
Thorium-228+7d	8.3×10^{2}
Thorium-230	3.5×10^{3}
Thorium-232+10d	2.7×10^{2}
Uranium, total (mg/L)	5.3×10^{-1}
Chemicals (mg/L)	
Alpha-chlordane	3.1×10^{-4}
Antimony	1.9×10^{-1}
Aroclor-1254	2.0×10^{-4}
Aroclor-1260	2.0×10^{-4}
Arsenic	4.9×10^{-2}
Barium	1.0×10^{2}
Benzene	2.8×10^{-1}
Benzo(a)anthracene	1.0×10^{-3}
Benzo(a)pyrene	1.0×10^{-3}
Beryllium	1.2×10^{-3}
Bis(2-chloroisopropyl)ether	2.8×10^{-1}
Bis(2-ethylhexyl)phthalate	8.4×10^{-3}
Bromodichloromethane	2.4×10^{-1}
Bromomethane	1.3×10^{0}
Cadmium	9.8×10^{-3}
Chloroform	7.9×10^{-2}

TABLE 2-4
(Continued)

Constituent	Final Remediation Levels
Chemicals (Cont.) (mg/L)	
Chromium VI	1.0×10^{-2}
Copper	1.2×10^{-2}
Cyanide	1.2×10^{-2}
Dibenzo(a,h)anthracene	1.0×10^{-3}
3,3-Dichlorobenzidene	7.7×10^{-3}
Di-n-butylphthalate	6.0×10^{0}
1,1-Dichloroethene	1.5×10^{-2}
Dieldrin	2.0×10^{-5}
Di-n-octylphthalate	5.0×10^{-3}
Fluoride	2.0×10^{0}
Lead	1.0×10^{-2}
Manganese	1.5×10^{0}
Mercury	2.0×10^{-4}
Methylene chloride	4.3×10^{-1}
4-Methylphenol	2.2×10^{0}
Molybdenum	1.5×10^{0}
Nickel	1.7×10^{-1}
Nitrate	2.4×10^{3}
4-Nitrophenol	7.4×10^{3}
Selenium	5.0×10^{-3}
Silver	5.0×10^{-3}
Tetrachloroethene	4.5×10^{-2}
1,1,1-Trichloroethane	1.0×10^{-3}
1,1,2-Tricholoroethane	2.3×10^{-1}
Vanadium	3.1×10^{0}
Zinc	1.1×10^{-1}

• The point of compliance is outside the mixing zone.

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TABLE 2-5

FINAL REMEDIATION LEVELS FOR SEDIMENT

Constituent	Final Remediation Levels
Radionuclides (pCi/g)	
Cesium-137(+1d)	7.0×10^{0}
Neptunium-237(+1d)	3.2×10^{1}
Lead-210(+2d)	3.9×10^{2}
Plutonium-238	1.2×10^{3}
Plutonium-239/240	1.1×10^{3}
Radium-226(+8d)	2.9×10^{0}
Radium-228(+1d)	4.8×10^{0}
Strontium-90(+1d)	7.1×10^{3}
Technetium-99	2.0×10^{5}
Thorium-228(+7d)	3.2×10^{0}
Thorium-230	1.8×10^{4}
Thorium-232(+10d)	1.6×10^{0}
Uranium, total (mg/kg)	2.1×10^{2}
Chemicals (mg/kg)	
Aroclor-1254	6.7×10^{-1}
Aroclor-1260	6.7×10^{-1}
Arsenic	9.4×10^{1}
Benzo(a)anthracene	1.9×10^{2}
Benzo(a)pyrene	1.9×10^{1}
Benzo(b)fluoranthene	1.9×10^{2}
Benzo(k)fluoranthene	1.9×10^{3}
Beryllium	3.3×10^{1}
Bis(2-ethylhexyl)phthalate	5.0×10^{3}
Bromoform	1.6×10^{2}
Cadmium	7.1×10^{1}
Carbazole	6.3×10^{1}
Chromium VI	3.0×10^{3}
Chrysene	1.9×10^{4}
Cobalt	3.6×10^{4}
Indeno(1,1,2-cd)-pyrene	1.9×10^{2}

TABLE 2-5
(Continued)

Constituent	Final Remediation Levels
Chemicals (Cont.) (mg/kg)	
Manganese	4.1×10^{2}
4-Methyl-2-pentanone	2.1×10^{3}
N-Nitrosodiphenylamine	2.6×10^{2}
Phenathrene	3.0×10^{-3}
Thallium	8.8×10^{1}

established through the Operable Unit 5 remedy decision process is more restrictive (i.e., lower) than that defined in an individual ROD for Operable Units 1, 2 or 4, the final Operable Unit 5 remediation level will serve as the soil cleanup criteria within the boundary of the source operable unit. ~~Final remediation levels for groundwater in the Great Miami Aquifer, surface water and sediment are present in ROD Tables 9-4, 9-5 and 9-6, respectively.~~

10 Another key component of the remedy is the establishment of waste acceptance criteria for the On-Site Disposal Facility, defined in ~~Table 9-7 of the ROD~~ Table 2-6. The waste acceptance criteria were derived to establish mass-based or activity-based operational limits for soil or sludge contaminant concentrations to ensure the long-term protection of the Great Miami aquifer underlying and downgradient of the On-Site Disposal Facility. The waste acceptance criteria were derived to ensure that the water quality in those portions of the aquifer potentially impacted by the On-Site Disposal Facility do not exceed the groundwater final remediation levels over the long term.

2.3 COMPLIANCE WITH APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS AND SUBSTANTIVE PERMITTING REQUIREMENTS

The Amended Consent Agreement requires that the compliance strategy for addressing substantive permit requirements and other applicable or relevant and appropriate requirements (ARARs) be initiated at the start of remedial action. The ARARs and to be considered (TBC) criteria were listed in Appendix B of the Operable Unit 5 ROD. In accordance with the Amended Consent Agreement, Paragraph XIII.B, the following specific information is required:

- Identification of each permit that would have been required in the absence of the CERCLA 121(e)(1) permitting exemption
- Identification of the standards, requirements, criteria, or limitations that would normally have to be met to obtain the permits
- Explanation of how the remedial action will meet the substantive requirements, criteria, or limitations identified above.

The Amended Consent Agreement further states that a permitting plan containing the above items should be submitted as a design deliverable under the schedule provided in this RD work plan. However, to address these requirements, on June 12, 1995 DOE provided a letter to EPA and OEPA

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TABLE 2-6

OPERABLE UNIT 5 ON-PROPERTY DISPOSAL FACILITY WASTE ACCEPTANCE CRITERIA

Constituent of Concern	Maximum Concentration
Radionuclides: (pCi/g)	
Neptunium-237	3.12×10^{9}
Strontium-90	5.67×10^{10}
Technetium-99	2.91×10^{1}
Total uranium - (mg/kg)	1.03×10^{3}
Organics (mg/kg):	
1,2-Dichloroethane	*
Carbazole	7.27×10^{4}
Bis(2-chlorisopropyl)ether	2.44×10^{-2}
Alpha-chlordane	2.89×10^{0}
Bromodichloromethane	9.03×10^{-1}
4-Nitroaniline	4.42×10^{-2}
Chloroethane[a]	3.92×10^{5}
1,1,1-Trichloroethane[a]	*
1,1-Dichloroethane[a]	*
Carbon tetrachloride[a]	*
Chloroform[a]	*
Methylene chloride[a]	*
Chloromethane[a]	*
Vinyl chloride[a]	1.51×10^{0}
Tetrachloroethene[a]	1.28×10^{2}
Trichloroethene[a]	1.28×10^{2}
1,1-Dichloroethene[a]	1.14×10^{1}
1,2-Dichloroethene[a]	1.14×10^{1}
Acetone[a]	*
Benzene[a]	*
Endrin[a]	*
Ethylbenzene[a]	*
Heptachlor[a]	*

TABLE 2-6
(Continued)

Constituent of Concern	Maximum Concentration
Organics (Cont.) (mg/kg):	
Heptachlor epoxide[a]	*
Hexachlorobutadiene[a]	*
Methoxychlor[a]	*
Methyl ethyl ketone[a]	*
Methyl isobutyl ketone[a]	*
Toluene[a]	*
Toxaphene[a]	1.06×10^5
Xylenes[a]	*
Inorganics (mg/kg):	
Boron	1.04×10^3
Mercury[a]	5.66×10^4
Chromium VI[a]	*
Barium[a]	*
Lead[a]	*
Silver[a]	*

[a] RCRA-based constituent of concern
* Denotes compounds that will not exceed designated Great Miami Aquifer action level within 1000-year performance period, regardless of starting concentration in the disposal facility.

which outlined the FEMP's strategy for compliance with permit-related substantive regulatory requirements for remedial actions at the site (Craig 1995). EPA and OEPA concurred with DOE's strategy outlined in the letter and agreed to the development of "compliance crosswalks" (including substantive permitting requirements) as a substitute for a formal permitting plan. These compliance crosswalks are to be supplied with the remedial design submittals to EPA and OEPA.

The ARARs and TBCs in the Operable Unit 5 ROD will be used as the basis for conducting soil remediation and groundwater restoration. The subset of those ARARS and TBCs that are pertinent to the scope of the remedial design deliverables will incorporate information to indicate where compliance would be addressed by the remedial action. Approval of the Operable Unit 5 design documents by EPA and OEPA will constitute approval that the compliance strategy meets the intentions of the Amended Consent Agreement and fulfills the FEMP's obligation to address ARARs and TBCs in the remedial design process.

The subset of ARARs that are pertinent to soil remediation will be defined in the Operable Unit 5 Site-Wide Excavation Plan (SEP) for area-specific design deliverables. The Area 1, Phase I RA Work Plan will also include a set of ARARs because its submittal precedes the SEP (see Section 4.0 for a description of the soil remedial design deliverable schedule). Area-specific design deliverables will also address any variations from the ARARs that are identified in the SEP, if necessary.

Similarly, ARARs pertinent to groundwater restoration will be furnished in the Operable Unit 5 Operations and Maintenance Plan as a compliance crosswalk. This plan will be developed to coordinate the extraction, collection, conveyance, treatment, and discharge of groundwater, storm water, and wastewater generated on a site-wide basis at the FEMP (see Section 3.0 for a description of the aquifer restoration design deliverable schedule).

3.0 REMEDIAL DESIGN STRATEGY FOR AQUIFER RESTORATION

Section 3.0 discusses the technical approach to remedial design for the Great Miami Aquifer remedy, outlines the design scope of work, and delineates the process and schedule for review and approval of the identified remedial design deliverables.

3.1 FACTORS AFFECTING REMEDIAL DESIGN

The remedy for the Great Miami Aquifer is unique at the FEMP in that major elements of the remedy have already been designed and implemented as a result of EPA-approved early start initiatives and groundwater-related removal actions. These elements include the South Plume Removal Action recovery well system, the advanced wastewater treatment (AWWT) facility, and the South Field Extraction System wells installed during 1995. The remedial design process must build upon this existing infrastructure and accommodate the early actions that are now in place.

The Operable Unit 5 FS Report and ROD outlined the site-wide remediation strategy for restoration of the aquifer, including the integration of existing actions into the final remedy. Under this strategy, restoration will be accomplished using a series of area-specific groundwater restoration modules and the centralized water treatment capabilities of the AWWT facility. Each area-specific module will be brought on line as needed during the life of the remedy and independently withdrawn from service once remedial objectives within an area are achieved. The installation sequence and operation of the modules will follow a coordinated schedule that is based on the remedial activities of other projects and the modeling projections of the duration and intensity of restoration actions necessary to achieve desired site-wide cleanup time frames and satisfy discharge requirements to the Great Miami River.

14 In order to demonstrate the feasibility of restoring the aquifer in a reasonable time frame, the Operable Unit 5 FS Report identified a "base case" system consisting of 28 conventional extraction wells (packaged into four discrete modules) and system-wide pumping rates of approximately 4000 gpm. Modeling simulations for the base case system indicated the aquifer could be restored in a 27-year time frame at a total present worth cost of about $160 million. It was acknowledged in the FS Report and the ROD (DOE 1995a, 1996) that the remedial design process would build upon the base case and evaluate additional scenarios that incorporated innovative enhancement technologies (such as injection) to further reduce remediation time, pumping-related hydraulic impacts, and cost. It was also acknowledged that the remedial design activity would address EPA's desire to restore the

off-property portion of the plume as the FEMP's highest groundwater priority. ~~, even though that portion of the plume is not necessarily the rate limiting area controlling overall remediation time.~~

Lastly, the FS Report also explicitly acknowledged the EPA's "learn as you go" improvement process for groundwater restoration that is contained in General Methods for Remedial Operation Performance Evaluations (EPA 1992b). As envisioned by this guidance, once a base case remedy is selected for a site and documented in a ROD, continuous efforts to improve system economics and efficiency should be extended throughout the post-ROD remedial design phase and over the life of the remedy. In the FS Report, DOE formally recognized the desire to incorporate this "learn as you go" philosophy into the modular, step-wise design strategy for the aquifer restoration program.

3.2 REMEDIAL DESIGN OBJECTIVES

14 In recognition of the above factors that have been identified for incorporation into the remedial design, ~~five~~ six fundamental objectives have been formulated for the Great Miami Aquifer remedial design process:

1. Accommodate the need for sequential restoration modules, each independently designed, installed, and operated using "learn as you go" principles over the life of the remedy

2. Build into the remedy the necessary enhancements and improvements (i.e., injection) that were envisioned by the Operable Unit 5 FS Report and ROD

3. Develop a sound remedial approach that will accomplish remedial action objectives within the aggressive time frames contained in the FEMP's current funding baseline

4. Accommodate the transition of the existing infrastructure and early start actions into a coordinated site-wide final remedy

5. Satisfy discharge limits for the release of groundwater, storm water, and remedial wastewater to the Great Miami River

14 6. Restore the off-property portion of the Great Miami Aquifer groundwater plume as the FEMP's highest groundwater priority.

In order to fulfill these objectives, a remedial design process that extends over the life of the remedy is required. The remedial design scope of work reflects the need to prepare stand-alone design packages for each of the area-specific restoration modules that will ultimately be brought on line.

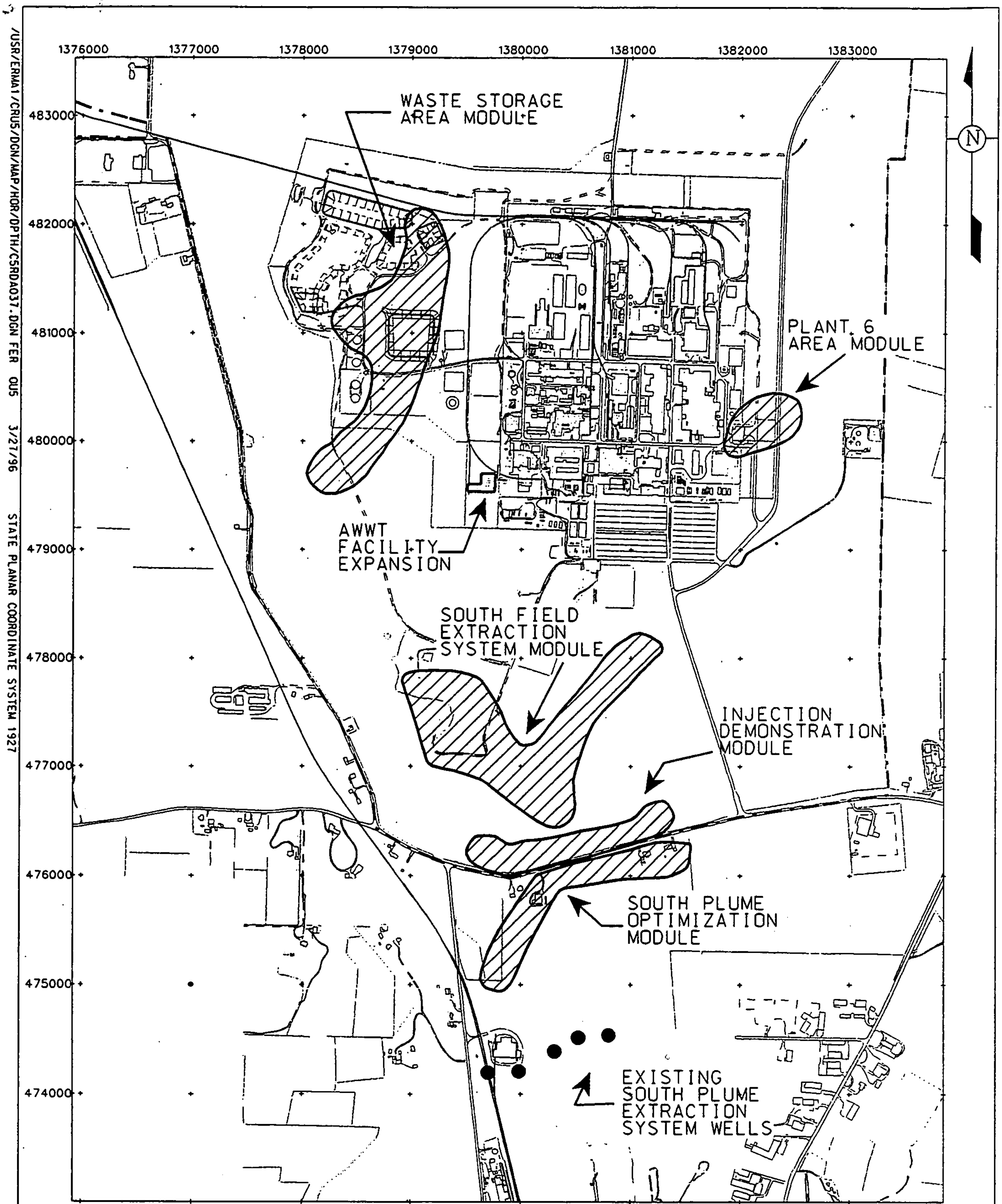
The delivery dates for each of the design packages have been estimated based on groundwater modeling projections of the behavior of the system over the entire life of the remedy. These projected dates represent the DOE's best technical estimates for when design submittals will be necessary, and form the basis for developing the enforceable RD delivery schedule contained in Section 3.5. It is important to be clear, however, that the "in-the-ground" performance of the system, once the various modules come on line, will dictate the actual dates for when the out-year design packages will be necessary. DOE is committing to the life-of-the-remedy RD delivery dates in Section 3.5 with the understanding that technical considerations may require adjustment of the dates forward or backward as system performance dictates.

The Amended Consent Agreement requires preparation of a remedial action work plan to cover construction activities and the establishment of an enforceable RA schedule. Initially an "umbrella" RA Work Plan will be submitted to provide all information required by the Consent Agreement and to convey the enforceable construction schedule for the first module to be brought on line. Then an abbreviated addendum to the RA Work Plan will be submitted for each successive module as a means of providing the enforceable construction schedule for that module. The RA Work Plan addenda will be furnished as part of the prefinal design package for each future module and will be tailored to address module-specific implementation issues and needs.

3.3 REMEDIAL DESIGN SCOPE OF WORK

The discrete work elements comprising the remedial design work scope for the Great Miami Aquifer program are described below. (These work elements are designated by task numbers for ease of reference, not to imply any ranking or sequence.) For each of the new restoration modules described in the following subsections, preliminary and prefinal design packages will be submitted for agency review. For the South Field Extraction System restoration module that was selected as an early start initiative, design reviews were completed through an EPA-approved project-specific plan process before issuance of the Operable Unit 5 ROD. The actual operation of the South Field Extraction System will be integrated into the RD/RA process by its incorporation into the system-wide Operations and Maintenance Plan (discussed under Task 2).

Figure 3-1 delineates the general geographic locations of the restoration modules that are described below.



LEGEND:

— · — · — FEMP BOUNDARY

NOTE: SHADED AREAS REPRESENT GEOGRAPHIC LOCATIONS WITHIN WHICH EXTRACTION AND/OR INJECTION WELLS ARE PLANNED

SCALE

1250 625 0 1250 FEET

DRAFT FINAL

FIGURE 3-1. LOCATION OF AQUIFER RESTORATION MODULES

3.3.1 Update of the Baseline Remedial Strategy - Task 1

36 As support for the RD process, the DOE will prepare a ~~summary report~~ Baseline Remedial Strategy Report that will summarize the results of the enhancement modeling simulations that extend beyond the base case FS system. The simulations will include an evaluation of injection technologies and the refinements in well locations necessary to enhance restoration of the off-property portion of the plume.

15 Four cleanup scenarios will be included in the simulations: 25, 15, 10, and 7.5 years. The scenarios
36 will be used to compare the cost implications of shortening the remediation schedule (thereby
37 reducing long-term operations and maintenance [O&M] costs) against the increased capital costs necessary to accommodate the additional infrastructure needed for a shorter remediation time. Following completion of the modeling simulations, the ~~summary report~~ Baseline Remedial Strategy Report will recommend a revised strategy to serve as the design basis for the full-scale program. ~~The report is expected to be furnished to EPA and OEPA for approval in the summer of 1996, before submission of the first formal RD deliverable (the preliminary design package for the AWWT facility expansion).~~ The Baseline Remedial Strategy Report will be submitted according to the schedule provided in Section 3.5.

3.3.2 Operations and Maintenance Plan - Task 2

A master Operations and Maintenance Plan will be developed as a means to coordinate the extraction, collection, conveyance, treatment, and discharge of all groundwater, storm water, and remediation wastewater generated on a site-wide basis over the life of the FEMP's cleanup mission. The plan will delineate the operating schedule, allowable direct discharge and treated water flow rates, system-by-system sequencing, and other operating constraints required to balance site-wide water management needs so that the FEMP's discharge limits (set forth in Section 2.1.5) are achieved. The plan will be modified as necessary over the life of the remedy to accommodate expansions to the system or the retiring of individual restoration modules from service once area-specific cleanup levels are achieved. The plan will thus serve as a living guidance document to instruct operations staff in implementing required adjustments to the system over time.

18 The plan will also serve as the focal point for coordinating and scheduling remedial wastewater conveyance and treatment needs with other projects throughout the duration of the FEMP's cleanup mission. ~~It is expected that the Operations and Maintenance Plan will be furnished to EPA and~~

~~OEPA for approval in the summer of 1997, approximately six months ahead of the effective date of the FEMP's 20 ppb total uranium discharge limit to the Great Miami River.~~ The Operations and Maintenance Plan will be submitted according to the schedule provided in Section 3.5. The date shown in Section 3.5 for submittal of this document is six months ahead of the effective date of the FEMP's 20 ppb total uranium discharge limit to the Great Miami River. All environmental monitoring activities conducted in support of operations and maintenance decisions will be conducted and reported through the Integrated Environmental Monitoring Plan (developed under Task 9 of this work plan).

3.3.3 South Field Extraction System Module Design (Complete) - Task 3

As discussed above, the South Field Extraction System was designed under an EPA-approved project-specific plan before issuance of the Operable Unit 5 ROD. The nine wells comprising this module were installed in the summer and fall of 1995. The remaining piping and other infrastructure needed to complete the system will be installed according to the initial implementation schedule provided in the RA Work Plan (discussed under Task 10). The operation of the wellfield will be coordinated with the other restoration and treatment components by the Operations and Maintenance Plan (prepared under Task 2).

It should be noted that the early-start South Field Extraction System module was designed to support the initial 28-well base case system presented in the Operable Unit 5 FS Report and ROD. If in future years additional wells are deemed necessary for the South Field module to match the final baseline strategy developed in Task 1, they will be accommodated through addenda to the existing design documents already furnished to EPA and OEPA. The sequencing strategy for such additions (if necessary) will be provided in the Baseline Remedial Strategy Report.

3.3.4 Injection Demonstration Module Design - Task 4

21 Currently, injection is under evaluation as a potentially viable enhancement for the overall restoration system. Pending the outcome of the evaluations discussed under Task 1 and the success of the field tests outlined in Section 3.5, a decision will be reached regarding the viability of incorporating injection into the final baseline strategy. If a positive decision is reached, Task 4 will be dedicated to the design of a first-phase, five-well injection demonstration module that will be used to prove out the technology at the field scale. This first-phase demonstration is expected to be funded through DOE Headquarters' EM-50 Technology Development Program. If the process then proves successful at the

field scale, additional injection wells will be incorporated into the design packages for the area-specific restoration modules as needed. The number and locations of the injection wells needed over the life of the remedy will be identified through the modeling simulations conducted under Task 1.

21 Similar to the other restoration modules, stand-alone design documents (developed under Task 4) will be submitted for the injection demonstration module in accordance with the schedule set forth in Section 3.5.

3.3.5 South Plume Optimization Module Design - Task 5

This module was so named during the agencies' review of the April 1995 South Plume Removal Action report and signifies the desire of EPA, OEPA and DOE to restore the off-property portion of the plume quickly and cost effectively. In order to accelerate the recovery of FEMP contaminants in the off-property area, additional wells are under consideration to supplement the existing South Plume containment wells situated at the leading edge of the plume. The optimal locations of the extraction wells will be determined as part of the modeling simulations under Task 1. The design of the wells and accompanying infrastructure will be accomplished by Task 5, and a stand-alone design package will be submitted according to the schedule set forth in Section 3.5. The operation of the South Plume optimization module will be coordinated with the other modules (including injection, as necessary) by updates to the Operations and Maintenance Plan.

3.3.6 Plant 6 Area Extraction Module Design - Task 6

The Plant 6 area module is necessary to recover contaminants from beneath and just east of the FEMP's former production area. The locations of the extraction wells for this system will be finalized as part of the modeling simulations under Task 1. The design of the wells and accompanying infrastructure will be accomplished by Task 6, and a stand-alone design package will be submitted according to the schedule set forth in Section 3.5. The operation of this module will be coordinated with the others (including injection, as necessary) by updates to the Operations and Maintenance Plan.

3.3.7 Waste Storage Area Extraction Module Design - Task 7

The waste storage area module is necessary to recover contaminants from beneath Operable Units 1 and 4. The locations of the extraction wells for this system will be finalized as part of the modeling simulations under Task 1. The design of the wells and accompanying infrastructure will be accomplished by Task 7, and a stand-alone design package will be submitted according to the schedule set forth in Section 3.5. The operation of this module will be coordinated with the others (including injection, as necessary) by updates to the Operations and Maintenance Plan.

3.3.8 AWWT Facility Expansion Design - Task 8

DOE 27 As discussed in the Operable Unit 5 ROD, the existing capacity of the AWWT facility will be expanded to the maximum achievable within the confines of Building 51. This capacity will be used to enhance the FEMP's ability to meet groundwater, storm water, and wastewater treatment needs and satisfy discharge requirements for release of water to the Great Miami River. DOE recognizes that January 1, 1998 is the ROD commitment date for satisfying the 20 ppb total uranium discharge criterion to the river. The design of the expansion ~~system~~ will be accomplished by Task 8. ~~, and a stand-alone design package will be submitted according to the schedule set forth in Section 3.5.~~ The manner in which the AWWT facility's capability is used ~~in concert with the FEMP's other restoration modules~~ to achieve discharge requirements will be coordinated over the life of the remedy through the Operations and Maintenance Plan. Similar to what has been provided for previous engineered enhancements to the AWWT facility (such as the slurry dewatering facility), DOE will provide EPA and OEPA with a Permit Information Summary to fulfill the substantive permit requirements of Section XIII of the Amended Consent Agreement. The Permit Information Summary will be provided to the EPA and OEPA for review 60 days prior to system construction, as shown in Table 3-1.

3.3.9 Integrated Environmental Monitoring Plan - Task 9

28 As the environmental media operable unit, Operable Unit 5 will be responsible for maintaining a baseline of environmental conditions at the site and monitoring impacts attributable to the implementation of the FEMP's site-wide remedial actions. Monitoring will also be conducted following the completion of cleanup as required to assess the continued protectiveness of the remedial actions. A site-wide integrated environmental monitoring plan (IEMP) will be developed that will specify the type and frequency of environmental monitoring activities to be conducted during remedy implementation and, ultimately, following the cessation of remedial operations as appropriate. ~~to determine when restoration activities for the Great Miami Aquifer are complete. The plan will address monitoring requirements for flora, fauna, air, surface water sediment and groundwater.~~ The IEMP will delineate the FEMP's responsibilities for sitewide monitoring of surface water and sediment over the life of the remedy, and to ensure that FRLs are achieved at project completion. The plan will also serve as the primary vehicle for determining to EPA and OEPA's satisfaction that

15,16,17,18,20,22,
23,25,26,27,36,37

TABLE 3-1

SCHEDULE OF REMEDIAL DESIGN DELIVERABLES FOR GROUNDWATER

Module-Specific Design Packages		
Restoration Module	Preliminary Package	Pre-Final Package
South Field Extraction System (Task 3)	Complete	Complete
~~Advanced Wastewater Treatment Facility Expansion (Task 8)~~	~~Included as part of FS Report~~	~~July 30, 1996~~
Injection Demonstration (Task 4)	August 1, 1996	December 1, 1996
South Plume Optimization (Task 5)	August 1, 1996	December 1, 1996
Waste Storage Area Extraction (Task 7)	June 15, 2001	November 30, 2001
Plant 6 Area Extraction (Task 6)	August 15, 2001	November 30, 2001

Remedial Action Work Plans and Technical Reports	
Deliverable	Submittal Date
Baseline Remedial Strategy Report (Task 1)	August 1, 1996
Integrated Environmental Monitoring Plan (IEMP) (Task 9)	August 1, 1996
Operation and Maintenance Plan (Task 2)	July 1, 1997
Remedial Action Work Plan for the Aquifer Restoration Project (Task 10)[a]	November 1, 1996
Site Closeout Report (Task 11)	90 days following project completion

Miscellaneous Tests and Studies in Support of Remedial Design	
Deliverable	Submittal Date
Short-Term Injection Test Report	October 1, 1996
Project Specific Plan: Restoration Area Verification Sampling	October 1, 1996
Summary Report: Restoration Area Verification Sampling	90 days following compilation of 4th quarter data
Permit Information Summary for the Advanced Wastewater Treatment Facility Expansion	60 days prior to system construction

[a]Addenda to the Remedial Action Work Plan will be furnished with each prefinal design package to convey module-specific enforceable RA construction schedules.

000049

remedial action objectives for the Great Miami Aquifer have been attained. In addition to these FRL attainment responsibilities, the IEMP will also define sitewide remedial monitoring requirements for biota and air.

The IEMP will complement the action-specific monitoring activities (conducted by the four source operable units during their respective remedial activities) and will be tailored to fulfill the FEMP's surveillance obligations to ensure that short-term risks due to remedy implementation activities are minimized.

22 Once approved, the IEMP will incorporate the routine monitoring functions for Operable Unit 5 currently conducted through the RCRA property-boundary groundwater monitoring program and the South Plume Removal Action Design, Monitoring, and Evaluation Program Plan as well as future remedy performance monitoring associated with the various groundwater extraction modules and the On-Site Disposal Facility. ~~The IEMP is expected to be submitted to EPA and OEPA for approval in the summer of 1996.~~ The IEMP will be submitted according to the schedule provided in Section 3.5. Environmental and routine discharge monitoring information developed as part of the IEMP will be used to support the remedy operating decisions conducted under the purview of the Operations and Maintenance Plan (Task 2) as necessary over the life of the Operable Unit 5 remedy.

3.3.10 Remedial Action Work Plan - Task 10

A Remedial Action Work Plan for aquifer restoration will be prepared to fulfill Amended Consent Agreement obligations. The RA Work Plan will provide all information required by the Amended Consent Agreement and convey the enforceable RA construction schedule for the first restoration modules to be brought on line through the enforceable post-ROD RD/RA process. As each successive module is added in the future, an addendum to the RA Work Plan will be furnished that will convey the enforceable RA construction schedule for that particular module. As shown in Section 3.5, the RA Work Plan will be submitted after the baseline remedial strategy is finalized, and individual addenda will be furnished as part of the prefinal design package prepared for each module. It is envisioned that the first enforceable RA construction schedule that will be provided with the RA Work Plan will encompass construction of the South Field Extraction System piping network and the AWWT facility expansion.

3.3.11 Site Closeout and Deletion of the FEMP from the CERCLA National Priorities List - Task 11

Based on current funding scenarios for the FEMP, the endpoint of the cleanup mission for the site will be defined by completion of the Great Miami Aquifer restoration project. Once remedial goals for the aquifer are achieved across the site (or necessary technical impracticability waivers granted by EPA), a site closeout report will be prepared and the formal documentation assembled to permit delisting of the FEMP from the CERCLA National Priorities List. Assembling the delisting package, conducting required public participation activities, and meeting all reporting requirements for formal closeout of the project will be handled under this task.

Project closeout will be conducted according to the EPA guidance that is in effect at the time of remedy completion.

3.4 TESTS AND STUDIES IN SUPPORT OF REMEDIAL DESIGN

Various tests have been deemed necessary to support the remedial design of the aquifer restoration system and the remediation techniques under evaluation. These tests are in various stages of completion and are all to be conducted under EPA-approved project-specific plans. The results of the tests will be factored into the design and summarized as needed in the design deliverables submitted to EPA and OEPA. A description of the various tests that are underway or have been completed to support remedial design is provided below.

3.4.1 Aquifer Pumping Test (Complete)

An aquifer pumping test was completed in the South Field area of the FEMP in May of 1995. The major objective of the pumping test was to supplement the RI/FS hydrogeologic database and assess hydraulic conductivity, storage, and anisotropy of the Great Miami Aquifer in the vicinity of the South Field Extraction System restoration module. Results of the pumping test indicated that the groundwater model for the area was using realistic and adequate hydraulic conductivity values. The verified model was used to design the South Field Extraction System.

24 3.4.2 Uranium Desorption Measurements (Ongoing Over the Life of the Remedy)

DOE As part of the Operable Unit 5 RI/FS, numerous desorption batch tests were performed to establish the range of uranium desorptive characteristics for the media comprising the Great Miami Aquifer. These characteristics affect the cleanup time and efficiency of the restoration system. To refine the

FEMP's understanding of this key parameter, additional desorption batch tests are currently being performed on aquifer media collected from the wells being installed for the South Field Extraction System. ~~This process~~ These measurements will be continued throughout the ~~implementation~~ installation of the remaining groundwater restoration modules ~~remedy~~ as part of the FEMP's commitment to "learn as you go." The refinements gained from the ongoing measurements will be incorporated into system~~-wide operational planning~~ design and operations as needed.

3.4.3 <u>Injection Test (In Progress)</u>

DOE 25 In October of 1995 a short-term injection test was performed to determine if the Great Miami Aquifer could accommodate anticipated injection rates without encountering undesirable geochemical interferences or physical plugging. The test demonstrated that desired injection rates could be maintained provided certain iron-based geochemical interactions could be overcome. ~~Work is in progress to address the geochemical limitations and~~ An additional short-term injection test was completed in ~~has been planned for~~ the spring of 1996. The results of this test were favorable indicating that the geochemical interactions that caused plugging in the initial test can be overcome. As indicated in Section 3.5, a report summarizing this followup test is expected to be submitted to EPA in October 1996.

3.4.4 <u>Restoration Area Verification Sampling (In Progress)</u>

In the FS Report for Operable Unit 5, it was acknowledged that the proposed remedial action "footprint" for the Great Miami Aquifer (see Figure 2-2) was based on the 20 ppb total uranium contour and that several nonuranium constituents are sporadically detected outside the proposed footprint at levels that occasionally exceed final remediation levels. This issue was also acknowledged in the FEMP's 1995 RCRA Annual Report for Groundwater, along with a recommendation for a focused sampling campaign to address geographic outliers and uncertainties in background concentration levels for several nonuranium constituents.

A sampling program is planned to address the data limitations raised in the FS Report and the 1995 RCRA Annual Report. The intent of the sampling is twofold: 1) to refine the definition of background concentration levels for several analytes where limited RI/FS data were available to establish background; and 2) to address the sporadic/isolated detections (i.e., outliers) of several nonuranium analytes above final remediation levels outside the boundaries of the 20 ppb uranium-based restoration footprint.

26 DOE An evaluation of all existing data for final remediation level exceedances is currently underway. Following the evaluation, a project specific plan will be prepared to define sampling requirements and locations, analytical support levels and detection limits, data validation procedures, data evaluation techniques and a project schedule. As indicated in Section 3.5, the project specific plan is expected to be submitted to EPA and OEPA in October 1996. Currently, it is envisioned that sampling will be conducted over four successive quarters. A summary report (indicated in Section 3.5) will be prepared following completion of the activity and any refinements to the restoration footprints will be accommodated within the appropriate restoration modules. The results of the verification sampling will also be used to support and refine the monitoring strategy conveyed in the IEMP.

3.5 PROJECT DELIVERABLES AND SCHEDULE

This RD Work Plan is a primary document as defined by the Amended Consent Agreement. It has been prepared and submitted within 60 days of receipt of EPA approval of the Operable Unit 5 Record of Decision, as required by Section XI.A, and will be reviewed, revised, and resubmitted in accordance with the time durations specified by the Sections XII.B.1 and XII.C.1.

Table 3-1 presents the design deliverables and enforceable document delivery schedule for the aquifer restoration portion of Operable Unit 5. Consistent with this schedule, preliminary and prefinal design packages will be furnished for each of the major modules comprising the aquifer restoration system. The preliminary packages will consist of narrative project descriptions and functional requirements and design basis documents; the prefinal packages will consist of detailed design drawings and specifications. As also shown in Table 3-1, the RA Work Plan will be submitted as a formal RD project deliverable. The enforceable RA construction schedules for future restoration modules will be provided as addenda to the RA Work Plan, furnished with the future prefinal design packages.

The document delivery dates that are shown in Table 3-1 are aligned with DOE's current long-term funding baseline. DOE has adopted the 10-year remediation scenario that is under consideration in Task 1 as the target case for baseline development. Preliminary modeling runs that have been completed as part of Task 1 were used to develop the baseline and the milestone dates contained in Table 3-1. These milestone dates represent the FEMP's best estimate of the dates for design submittals. DOE commits to the enforceable RD delivery schedule shown in Table 3-1 with the understanding that technical considerations may require future adjustment of the dates based on the "in-the-ground" performance of the system. Should it prove necessary to adjust a document delivery date forward or backward because of technical considerations, DOE will furnish the necessary technical justification for EPA's consideration.

3.6 PLAN FOR REVIEW AND FINALIZATION OF DESIGN DELIVERABLES

The DOE will formally address all EPA and OEPA comments on the preliminary design review packages through submittal of a comment response document within 30 days (plus 20-day extensions, if necessary) of receipt of both agencies' comments. DOE does not plan to submit revised preliminary design documents, but rather will incorporate comment resolutions into the prefinal design.

The DOE will formally address all comments submitted by EPA and OEPA on the prefinal design packages through the submittal of a comment response document within 30 days (plus 20-day extensions, if necessary) of receipt of both agencies' comments. Following approval of the comment response document, all comment resolutions will be incorporated and the final design will be issued for construction.

The RA Work Plan will also be subject to the 30-day comment response cycle (plus 20-day extensions, if necessary) as required for the design packages.

3.7 COMMENCEMENT OF REMEDIAL ACTION

The design approach presented in this RD Work Plan, coupled with the existing actions that are already underway for the Great Miami Aquifer, establish the basis by which Operable Unit 5 meets the requirements of Section 120 (e)(2) of CERCLA for commencing substantial, continuous on-site remedial action within 15 months of the signing of the Operable Unit 5 Record of Decision. The actions extending beyond this required commencement will be implemented according to the sequencing strategy and schedule provided in the Remedial Action Work Plan for Aquifer Restoration.

4.0 REMEDIAL DESIGN STRATEGY FOR SOIL REMEDIATION

The basis for soil remediation includes the pertinent elements of the Operable Unit 5 selected remedy (Section 2.0) as they relate to soil and sediment excavation. This section presents the strategy for the design of those soil remediation elements, including descriptions of the soil remediation sequence drivers; remediation areas; scope of remedial design packages; design schedules; and the process for review and finalization of the deliverables.

4.1 SOIL REMEDIATION SEQUENCE DRIVERS

For planning purposes under the 10-year remediation scenario, the FEMP site has been broken into seven remediation areas and sub-areas, identified as phases (Figure 4-1). The factors influencing the proposed sequence of soil excavation during remediation of these areas include:

- Remediating upgradient areas first, with respect to surface water and groundwater flow directions to minimize the potential for recontamination

30

- ~~Remediating and certifying, where necessary, that an area is below final remediation levels to support remedial action commitments for other operable units~~ Remediating and certifying on a priority basis, where necessary, that surface and subsurface soil (including soil found within affected perched groundwater zones) attains final remediation levels specified in the Operable Unit 5 ROD to support the implementation schedules of other FEMP projects (e.g., excavating and certifying remaining soil in the On-Site Disposal Facility footprint before construction by Operable Unit 2)

- Implementing reasonable construction practices needed to complete remediation (e.g., proper side slopes for open excavations)

- Finalizing the remediation of an area subsequent to remediation by other operable units (e.g., soil remediation cannot be performed in the former production area until the above-grade structures are dismantled by Operable Unit 3)

- Complying with federal budget constraints.

While Figure 4-1 indicates the approximate boundaries for the seven remediation areas, actual boundaries are contingent on circumstances encountered during remediation including, for example, the final extent of contamination identified within a certain hydrogeologic environment or intercepting unexpected subgrade features (synthetic or natural) during excavation. Implementation of site-wide remedial action as it relates to the RD/RA requirements specified in the Amended Consent Agreement is described below.

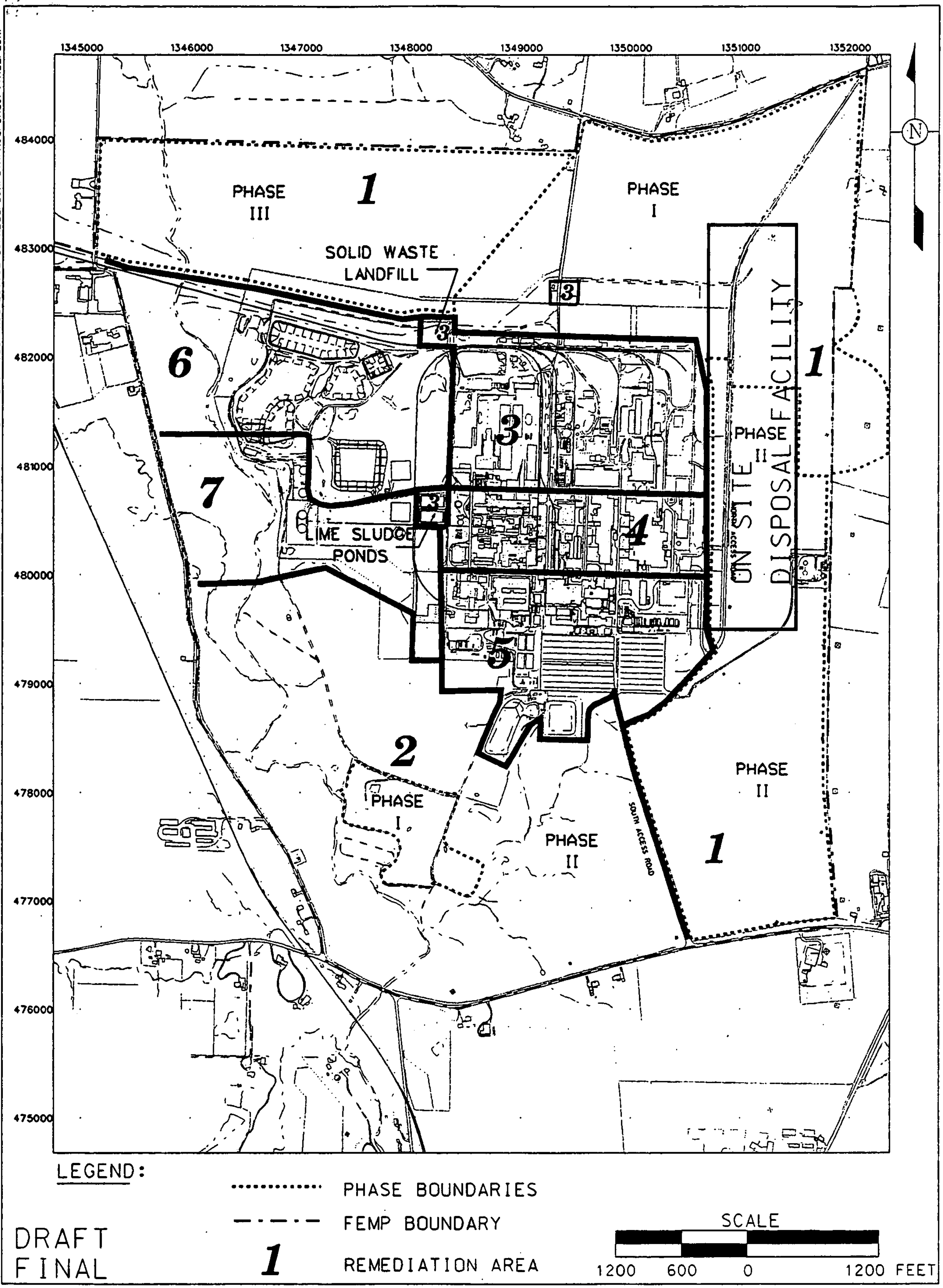


FIGURE 4-1. SITEWIDE REMEDIATION AREAS

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4.2 REMEDIAL DESIGN STRATEGY AND SCOPE

The purpose of remedial design is to establish the overall plan for implementation of the remedy. Remedial design utilizes strategic planning, traditional design packages (drawings and specifications), and detailed remedial action planning. As presented in the Amended Consent Agreement, this includes preparation of remedial action work plans to cover construction activities and the establishment of an enforceable RA schedule. The goals of remedial design, and the intent of the Amended Consent Agreement, will be addressed in soil remediation through the following steps:

- Evaluation of emerging technologies
- Development of integrated remedial design packages
- Site-wide excavation planning

Several emerging technologies will be evaluated in a Technology Report prior to commencement of substantial remedial design activities. This report is described in more detail in Section 4.2.1.

Site-wide planning for soil excavation will be addressed in the Site-Wide Excavation Plan. The SEP will provide the management strategy necessary to govern site-wide soil remediation. Information to be included in the SEP will consist of methods, or protocols, that will be used during each phase of remediation. The elements to be incorporated into the SEP are described in Section 4.2.2.

Area-specific integrated remedial design packages (IRDPs) will be provided for each remediation area in phases that correlate to the sequence of implementing remedial action (Figure 4-2). Phasing of these remedial design deliverables will accomplish two goals: 1) expedite remediation to facilitate the 10-year plan and 2) accommodate the lessons learned. This concept was identified in the Operable Unit 5 FS Report, based on Guidance on Expediting Remedial Design and Remedial Action (EPA 1990). The guidance suggests that accelerated cleanup can be achieved by phasing a project into meaningful remedial work elements that can be implemented on different schedules, which results in acceleration of remedial design and remedial action. The remedial work elements for soil remediation are outlined in Section 4.1.

Each IRDP will include an area-specific implementation plan that incorporates the area-specific elements of a RA work plan, design drawings and specifications. The information to be provided in the general scope of work for each of these deliverables is summarized in Section 4.2.3. Each IRDP will incorporate the lessons learned concept so that remedial action can be streamlined for each subsequent phase of soil remediation.

The phasing of the remedial design deliverables is presented in Figure 4-2. The submittal schedule for these deliverables, as required in the Amended Consent Agreement, Section XI, is identified in Table 4-1.

4.2.1 Technology Report

A formal commitment has been made by the DOE as part of the remedy for Operable Unit 5 to evaluate emerging technologies for the treatment of soil and sediment before placement of the soil and sediment into the On-Site Disposal Facility. The DOE continues to advocate the development of innovative technologies that are environmentally acceptable and have cost/benefit potential for implementing the remedy and enhancing the long-term permanence of the On-Site Disposal Facility.

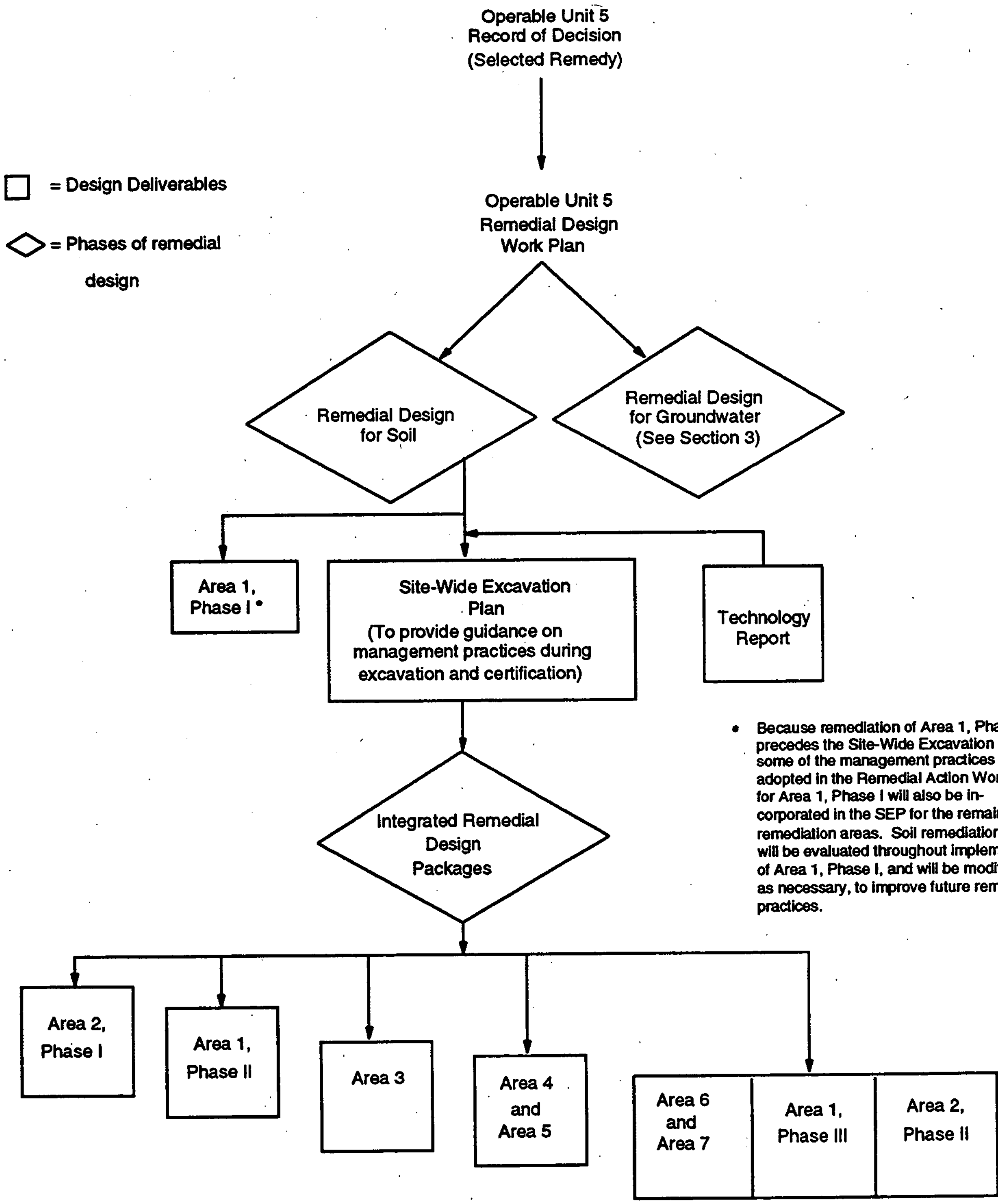
The potential application of treatment technologies during remediation will be based on the cost-effectiveness and implementability of the technology. Four technologies are currently being considered:

- Physical separation to reduce soil volumes to be shipped off site (i.e., soil that exceeds the on-site waste acceptance criteria) and gravel that may remain on site
- Vacuum extrusion/compaction of soil
- Phosphate soil stabilization
- Geochemical barrier placement amendment for its potential ability to stabilize uranium.

38 Results of these studies are ~~will be~~ presented in four separate ~~as a~~ project reports, which were ~~to be~~ submitted to the EPA and OEPA on May 24, 1996 (see Table 4-1). Recommendations for their application during remediation is proposed in that report.

4.2.2 Site-Wide Excavation Plan

DOE The SEP will provide an explanation of soil excavation and management practices to be used consistently in all seven remediation areas. This document will contain support documentation that can be independently updated to streamline the soil remediation approach. ~~be updated, as necessary, through the IRDPs to incorporate modifications for streamlining for the individual remediation areas.~~



* Because remediation of Area 1, Phase I precedes the Site-Wide Excavation Plan, some of the management practices that are adopted in the Remedial Action Work Plan for Area 1, Phase I will also be incorporated in the SEP for the remaining remediation areas. Soil remediation practices will be evaluated throughout implementation of Area 1, Phase I, and will be modified, as necessary, to improve future remediation practices.

FIGURE 4-2. PHASING OF OPERABLE UNIT 5 SOIL REMEDIATION DESIGN DELIVERABLES

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TABLE 4-1

SCHEDULE OF REMEDIAL DESIGN DELIVERABLES FOR SOIL

Deliverable	Status	Submittal Date
Technology Report	Draft	May 24, 1996
Site-wide Excavation Plan	Draft	March 14, 1997
Integrated Remedial Design Packages:		
Area 1, Phase I	Prefinal	July 17, 1996
Area 1, Phase II	Prefinal	June 26, 1997
Area 2, Phase I*	Prefinal	March 14, 1997
Area 3	Prefinal	July 2, 1998
Area 4 and Area 5	Prefinal	November 15, 2000
Area 6; Area 7; Area 1, Phase III; and Area 2, Phase II	Prefinal	January 15, 2001

* Area 2, Phase I consists of the Operable Unit 2 Waste Units.

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The SEP will address the following:

28 32 39
- Decision Criteria - The overall logic for several remediation decisions will be provided for: ~~in verifying~~ identifying the extent of contamination, ~~will be provided~~ establishing site-wide COC screening criteria, determining ~~addition to finalizing~~ area-specific COCs, and addressing the waste acceptance criteria for the On-Site Disposal Facility. ~~, and~~ In addition, methods will be described for certifying that final remediation levels ~~are achieved~~ for surface and subsurface soil (including soil found within affected perched groundwater zones) are attained during excavation. The soil final remediation levels provided in the Operable Unit 5 ROD (and included in Section 2.0 of this work plan) consider the potential for cross media impacts through the perched groundwater system and address the varying leachability of the uranium species found within and outside the FEMP's process area.

DOE
- Excavation of At- and Below-Grade Improvements - Integration between Operable Unit 3 and Operable Unit 5 for excavation of at- and below-grade features will be established. Soil remediation activities will include excavation of slabs, foundations, below-grade piping, and other below-grade ancillary structures.

- Contingency Plan - The strategy for implementing a contingency plan will be defined.

- Closeout Requirements - The documentation, or procedures, that will be necessary during remedial action will be defined to successfully complete the goals of the selected remedy for soil.

- Impacted Materials Management - General protocol for soil segregation, stockpiling, staging and maintenance will be established.

31
- Sampling and Analysis Methods and Requirements - Data quality objectives, analytical requirements, sampling methods, representative sampling, sampling rationale, and sampling frequency will be outlined.

7
- Excavation Control - Monitoring of excavation areas to achieve final remediation levels will be considered. Protocol for perched groundwater dewatering methods, slope stability, soil management and staging requirements will be addressed.

- Site Health and Safety Matrix - Health and safety protocols that remain the same for all IRDPs will be provided.

- Quality Assurance/Quality Control - Outline requirements for roles and responsibilities, standard operating procedures, document control, change notices, sampling and analyses will be outlined.

- Access Controls - The appropriate access controls to support soil remediation will be identified.

- Operation and Maintenance - Guidelines for performing operations and maintenance will be described for managing equipment, storage/staging areas, performing dust suppression, and implementing erosion and storm water controls will be established.

- Excavation Monitoring - General monitoring requirements for air, noise, and surface water (NPDES) will be identified to meet environmental and regulatory standards, consistent with the IEMP.

- Regulatory considerations - The compliance strategy for ARARs, site agreements, and other regulatory criteria that may impact procedures for conducting remediation will be identified.

- Baseline Grading - The guidelines for site grading will be established to control surface runoff after remediation. These guidelines will serve as the basis for developing final land use options, wetland mitigation, and associated institutional controls.

- Technology Studies - Potential use of technology studies will be addressed, based on the results of the technology report that is discussed in Section 4.2.1.

29 - Measures to Minimize Impacts - Identification of potential impacts to ensure protection of threatened and endangered species, and protocol for ensuring protection of archeological and cultural finds during remediation will be addressed.

4.2.3 Integrated Remedial Design Packages

The IRDPs will be prepared for individual areas or a combination of the remediation areas shown in Figure 4-1. Each of these packages will provide area-specific information that is not addressed in the SEP, but is nonetheless necessary to conduct remediation. Each package will include an area-specific implementation plan, design drawings, and specifications. The general content of an IRDP is listed below.

28 Implementation Plan:
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- Schedule of remedial activities
- Scope of work and boundaries of the area, including areas of remediation
- Summary of existing RI data and/or process knowledge to perform remediation
- Summary of subsurface conditions, if necessary
- Summary of known extent of contamination
- Identification of ASCOCs
- Anticipated excavation boundaries
- Area-specific access control requirements
- Excavation control elements
- Erosion and surface water control
- Soil certification protocols, to determine that actions are complete

Design Drawings:

- Site preparation and temporary facilities location
- Excavation plan and cross-sections
- Storm water control elements
- Erosion and sediment control

- Grading plan
- Decontamination facility utilities to be saved/removed
- Survey monuments

Specifications:

- General conditions

  - Summary of work
  - Submittal schedule
  - Health and safety requirements
  - Mobilization and site access
  - Quality assurance/quality control requirements
  - Management of impacted material

- Construction-related items

  - Dust control measures
  - Erosion control measures
  - Excavation requirements
  - Demolition requirements
  - Dewatering requirements
  - Waste handling/disposition
  - Restoration
  - Process piping.

The submittal schedule of all design deliverables, including the SEP and the Technology Report, is summarized in Table 4-1. Each IRDP is listed in the sequence that remediation is anticipated to begin under the 10-year scenario, and as integration with other operable unit's schedules dictate. As indicated in Table 4-1, individual IRDPs will be submitted for more than one area in some instances. A summary level description of the remediation areas associated with each IRDP submittal follows.

Area 1, Phase I

The Area 1, Phase I RA Work Plan will present the approach and methods that will be employed to excavate and certify that final remediation levels are achieved for the pertinent areas. This is being submitted before the SEP because of the time constraints imposed to support initial construction of the On-Site Disposal Facility; relocation of the North Access Road; and construction of the Operable Unit 1 rail yard north of the former production area. This work plan will include drawings and specifications similar to the IRDPs. Because this document is being submitted before the SEP, it will also include pertinent site-wide information that will later be incorporated into the SEP, such as ARARs and environmental monitoring.

<u>Area 2, Phase I</u>

Remediation of this area consists of excavating all residual soil beneath the southern Operable Unit 2 waste units that exceed the final remediation levels. The waste units consist of the South Field and the Active and Inactive Flyash Piles. Submittal of the associated remedial design package is governed by the schedule in the *Final Remedial Design Work Plan for Remedial Actions at Operable Unit 2* (DOE 1995b). However, remediation of this area will be conducted by the Soil Remediation Project.

<u>Area 1, Phase II</u>

Area 1, Phase II includes excavation of soil and debris that will remain after D&D of the sewage treatment plant. Portions of the surrounding area may require deep (greater than 4 feet) excavation. This design package will be submitted as a prefinal deliverable.

<u>Area 3</u>

Remediation of Area 3 requires removal of soil and debris that exceed the final remediation level following D&D by Operable Unit 3 of structures within the northern portion of the former production area; the fire training facility will be remediated with Area 3. Deep excavation (i.e., greater than 4 feet) is anticipated in portions of Area 3 and the fire training facility. The Area 3 design package will be submitted as a prefinal deliverable.

<u>Areas 4 and 5</u>

The scope of Areas 4 and 5 includes remediating residual soil and debris subsequent to decontamination and demolition for the middle portion of the former production area (Operable Unit 3). Deep excavation (i.e., greater than 4 feet) is anticipated in portions of this area. Area 5 will include remediation of the storm water retention basin. The Area 4 and 5 design package will be submitted as a prefinal deliverable.

<u>Areas 6 and 7; Area 1, Phase III; and Area 2, Phase II</u>

4 Areas 6 and 7 consist of the soil and debris remaining after removal of the Operable Unit 1 waste
6 pits, the Operable Unit 5 AWWT, and Operable Unit 4 silos. Area 1, Phase III includes shallow excavation of the wetlands just north of the Area 6 northern boundary line; contamination is expected to be limited to the vicinity of the railroad tracks. Area 2, Phase II consists of suspect areas of contamination within Area 2 but outside the Operable Unit 2 waste unit boundaries (Area 2, Phase I). This design package will be submitted as a prefinal deliverable.

4.3 PLAN FOR REVIEW AND FINALIZATION OF DESIGN DELIVERABLES

The DOE will formally address all EPA and OEPA comments on the design deliverables through the submittal of a comment response document within 30 days of receipt of the agencies' comments. Comments will be incorporated into each design document, although revisions will not be formally submitted for the IRDPs. Submittal dates are summarized in Table 4-1. If a remediation area is determined to provide unique or unanticipated remediation challenges, DOE may request a formal preliminary review for a design deliverable not already considered in this RD Work Plan.

4.4 COMMENCEMENT OF REMEDIAL ACTION

The design deliverables proposed in this RD Work Plan establish that the schedule for soil and groundwater remediation meets with the requirements under CERCLA [Section 120(e)(2)] for commencing substantial and continuous remedial action within 15 months of the ROD approval. Remedial actions are already underway for aquifer restoration that will comply with the 15 month criteria and will continue as additional actions are implemented under the Remedial Action Work Plan for aquifer restoration (Section 3). Soil remedial actions will commence and continue with the schedules for remedial actions to be identified in the individual IRDPs.

5.0 PROGRAM MANAGEMENT

This section describes the elements of program management to be used during the OU5 Remedial Action. These elements include two basic components -- Program Organization and Community Relations -- which are described in the sections below.

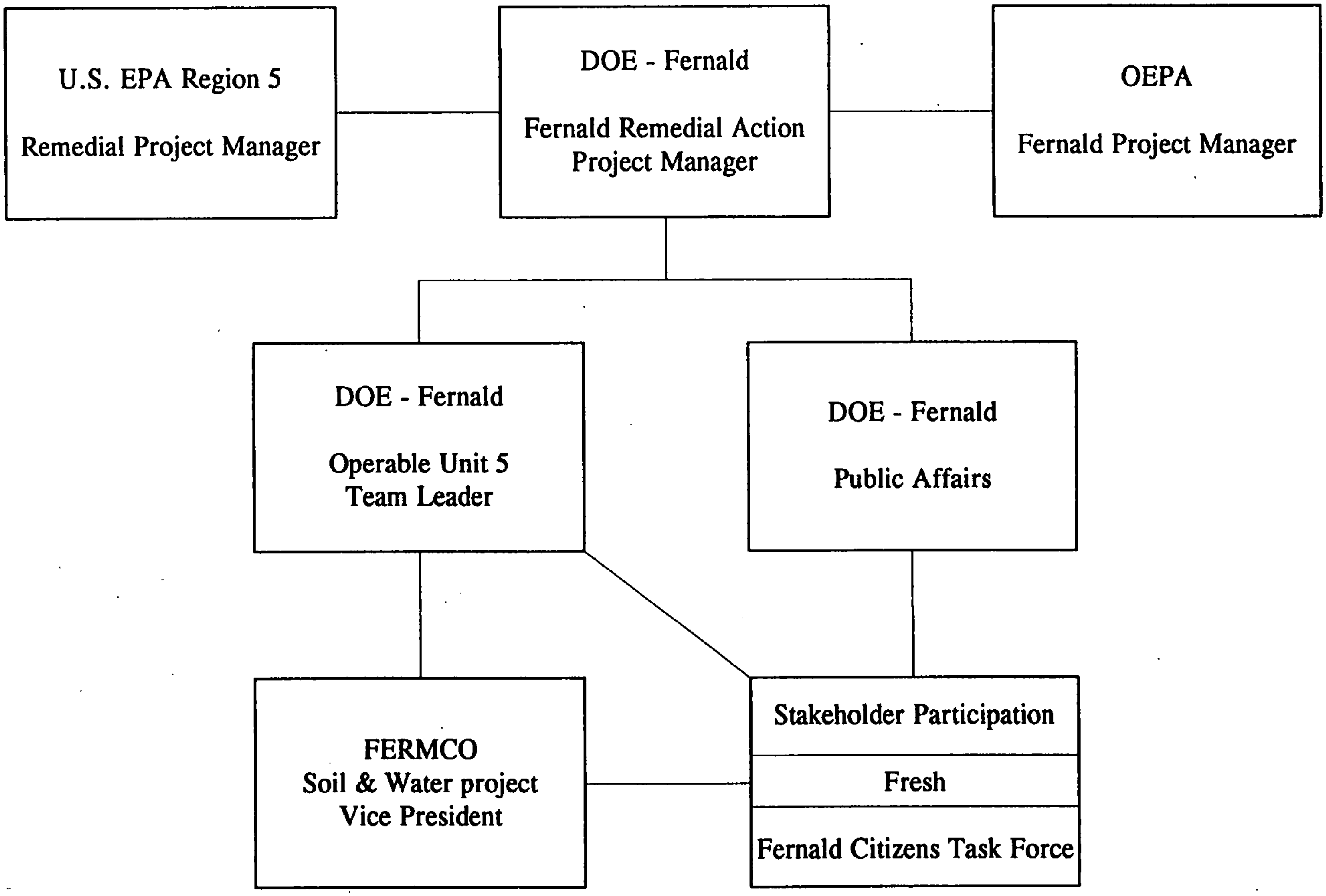
5.1 PROGRAM ORGANIZATION

33 The Program Organization is based on lines of authority and communication between several entities and organizational bodies including the DOE, FERMCO (the DOE primary contractor), regulatory agencies, and the community. The fundamental organization between these entities has remained essentially constant throughout the CERCLA process to date, and most likely will stay constant during the site remediation and post-remediation phase. The program organization within FERMCO, however, has been realigned to better accommodate the post-ROD project activity phase of the remedial action, as the investigatory phases of the CERCLA process have been completed. The refined program organization for FERMCO is described below, after a brief description of the basic organization between the primary entities and organizational bodies.

DOE 34 Per the Amended Consent Agreement, the ultimate project management responsibility for the CERCLA remedial action lies with the DOE and the EPA. The DOE serves as the overall project lead, with the EPA providing an oversight and advisory role during the remedial action. In addition, the OEPA has been granted regulatory authority over certain RCRA activities, and also provides an oversight and advisory role. The DOE provides overall programmatic direction to FERMCO (its' primary contractor) during remedial design and remedial action. During the remedial action process, the community and public stakeholders are kept informed and are encouraged to provide input. Figure 5-1 depicts the inter-relationship between DOE, FERMCO, EPA, OEPA, and the community.

To date, four of the five FEMP Operable Unit RODs have been signed, and the overall scope of the remediation has changed from investigation to remedial action. In order to reflect this change in scope from the investigation phase into the remedial design and remedial action phase, the FEMP has developed an integrated remediation strategy focusing on accelerated remedial design and action. At the heart of this strategy is integrated project planning which consolidates cleanup activities and schedules across the projects to complete final cleanup of the Fernald site.

FIGURE 5-1
OPERABLE UNIT 5 PROGRAMMATIC ORGANIZATION CHART



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within the accelerated remediation plan. The site master schedule developed in October 1995 dictates the sequence of all site remediation activities.

The integrated project planning under FERMCO re-focused the operable unit concept into primary projects, which was undertaken to permit the more efficient completion of the FEMP site-wide remediation. It is important to emphasize that the realignment does not alter the requirements of the FEMP's Records of Decision. Organizing in recognition of "the way the work will be performed" fosters improved communication and project integration. As a result of this realignment, six project organizations that correlate to the operable units (as defined in the Amended Consent Agreement) were established that include: the Waste Pits Remedial Action Project (Operable Unit 1), the On-Site Disposal Facility Project (Operable Unit 2), the Facilities D&D Project (Operable Unit 3), the Fernald Residues Vitrification Plant Project (Operable Unit 4), the Soil Remediation Project (Operable Units 2 and 5), and the Aquifer Restoration Project (Operable Unit 5).

After the operable units were re-focused into the six primary remedial action projects, FERMCO initiated a reorganization into three primary remedial action organizations. The organization pertinent to the OU5 RD Work Plan is the Soil and Water Projects, under which are eight projects (Figure 5-2). Four of these eight projects are responsible for completing the tasks related to the OU5 RD Work Plan and are: the Aquifer Restoration Project, the AWWT and Wastewater Project, the Soil Characterization and Excavation Project, and Environmental Monitoring. The general scope of each project are as follows:

- The Aquifer Restoration Project is responsible for designing, installing, and operating the pumping systems (and potentially reinjection systems) for the Great Miami Aquifer groundwater restoration. Pumped groundwater will be routed to the AWWT and Wastewater Project for subsequent treatment and discharge.

- The AWWT and Wastewater Project is responsible for the designing, constructing, and operating all wastewater, storm water and treated effluent discharge systems at the FEMP. Each project is responsible for collection of surface water needing treatment and its transport to the AWWT.

- The Soil Characterization and Excavation Project includes responsibility for remediation of all Operable Unit 2 subunits; all soil, sediment, and perched groundwater (through meeting soil FRLs) remediation; and site restoration and disposition of excavated material into the on-site disposal facility (provided the material meets the on-site disposal facility waste acceptance criteria).

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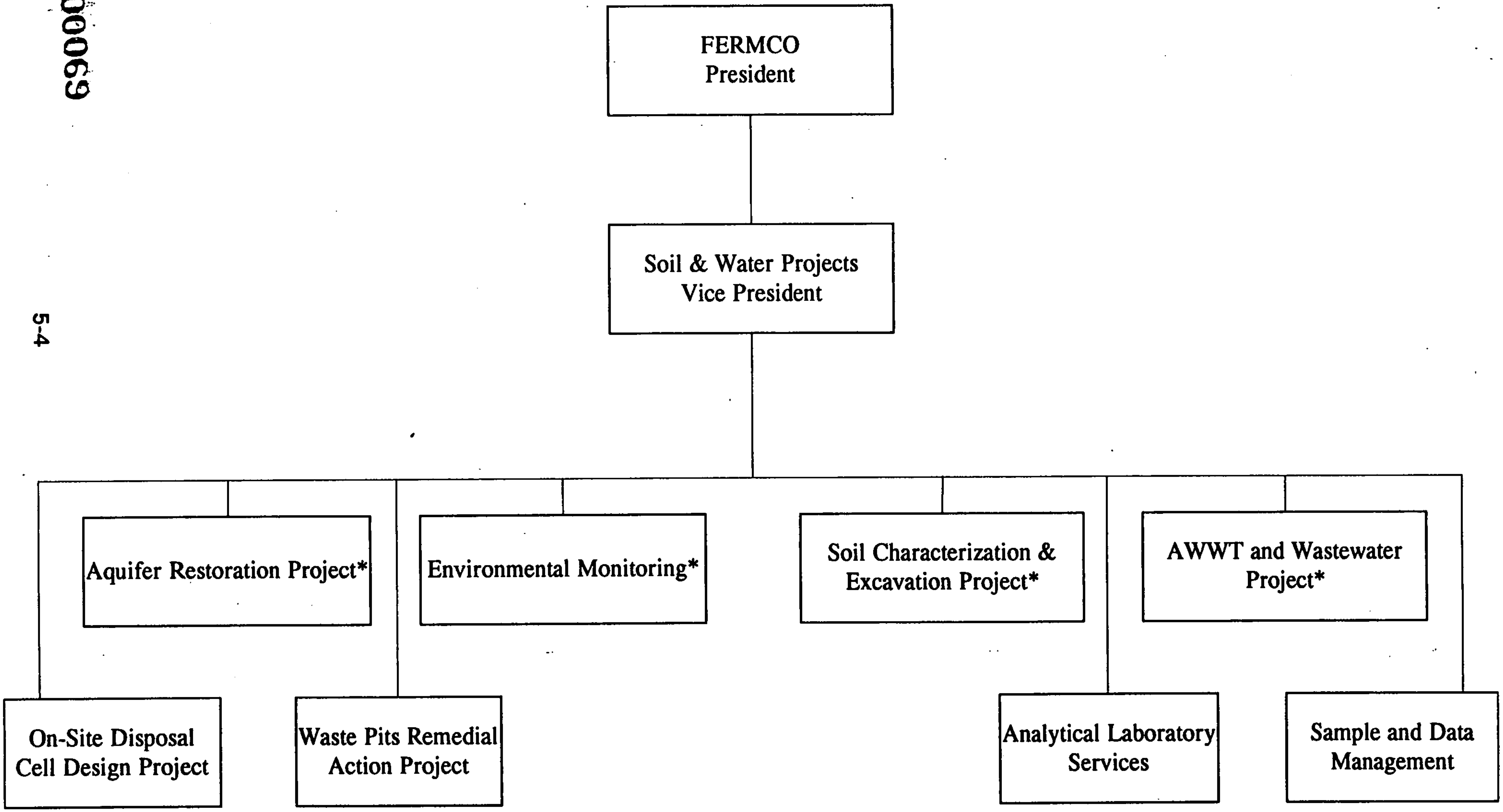
FIGURE 5-2
OPERABLE UNIT 5
PROJECT ORGANIZATION CHART



* Indicates Operable Unit 5 Projects

- Environmental Monitoring is responsible for sitewide monitoring of all environmental media including groundwater, surface water, sediment, air, and biota.

The other four projects under Soil and Water Projects are either support organizations or involve other aspects of the site-wide remedial action. These projects are the Waste Pits Remedial Action Project, the On-Site Disposal Facility Design Project, Analytical Laboratory Services, and Sample and Data Management. The general scope of each of these four projects and their relationship to the scope of the OU5 RD Work Plan are as follows:

- The Waste Pits Remedial Action Project is responsible for the excavation, treatment (thermal drying) and off-site disposal of waste pit material. The Soil Excavation and Certification Project will be responsible for excavating contaminated soil below the waste pits to meet OU5 FRLs. Some soil excavated by the Soil excavation and Certification project in this and other areas may not meet the waste acceptance criteria for the On-site Disposal Cell. Such soils may be disposed of off-site and may be managed by the Waste Pits Remedial Action Project for off-site disposal, along with other Waste Pits Remedial Action Project wastes. During remedial activities, the Waste Pits Remedial Action Project is responsible for collecting and transporting contaminated surface water runoff, infiltration water within excavations, and treatment wastewaters to the AWWT and Wastewater Project for subsequent treatment and discharge.

- The On-site Disposal Facility Design Project is responsible for the design, installation, and closure of the On-site Disposal Facility. The On-Site Disposal Facility will receive those remediation wastes meeting the on-site disposal facility waste acceptance criteria. The Soil Characterization and Excavation Project is responsible for sampling the soil to identify if the soil meets the waste acceptance criteria for disposal in the on-site disposal facility. During construction and filling of the on-site disposal facility, the On-site Disposal Facility Design Project is responsible for the collection, management, and transport of leachate and surface water runoff to the AWWT and Wastewater Project.

- Analytical Laboratory Services will be responsible for the on-site analysis of waste and environmental media samples, for the shipment of samples to off-site laboratories, and receipt of the analytical data generated at the off-site laboratories. Data obtained from all analysis will be handled under Sample and Data Management.

- Sample and Data Management will be responsible for collecting analytical data from on and off-site laboratories, verifying the data, and for managing this data in site-wide databases.

Each of the eight projects has a FERMCO project director has been assigned responsibility for the execution of the project scope. The FERMCO vice president for Soil and Water Projects provides overall programmatic guidance to the FERMCO project directors. Each project director is responsible for the preparation of remedial design deliverables and/or for ensuring that site-wide quality standards are maintained within the project. Successful implementation of the accelerated remediation case is dependent upon the close coordination of remediation project activities among all project organizations throughout the remedial design/remedial action process.

5.2 COMMUNITY RELATIONS

The FEMP's Community Relations Plan complies with the public participation requirements of all applicable laws and regulations, including CERCLA, the Federal Facilities Compliance Act, the National Environmental Policy Act and the NCP, and also reflects EPA guidance from Community Relations in Superfund: A Handbook (EPA 1992a). The Plan provides details about how management will involve the public in decisions related to the site during the remedial action phase of CERCLA response actions at the FEMP. Required activities are to:

- Provide a public briefing upon completion of the final engineering design and before the beginning of the remedial action [NCP 300.435]

- Publish in a local newspaper of general distribution a Notice of Availability of documents submitted to the EPA under the remedial action [DOE commitment/directive].

12 When practicable, the DOE has and will continue to offer public involvement opportunities — surpassing regulatory requirements — throughout the remediation and post-remediation monitoring phases ~~remedial action phase~~ of site cleanup.

Throughout the duration of FEMP remediation activities, the Community Relations Plan may be revised to reflect changing community concerns as well as changes in the law, regulations or regulatory agreements.

REFERENCES

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